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American Cinematographer



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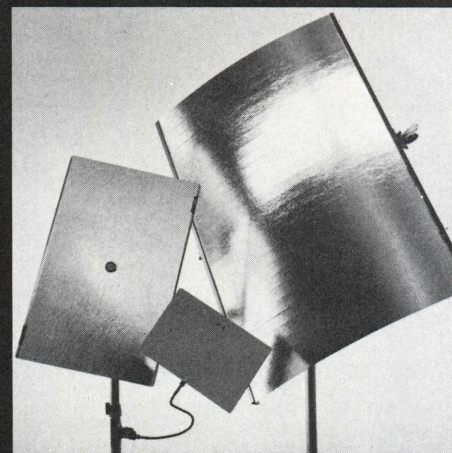
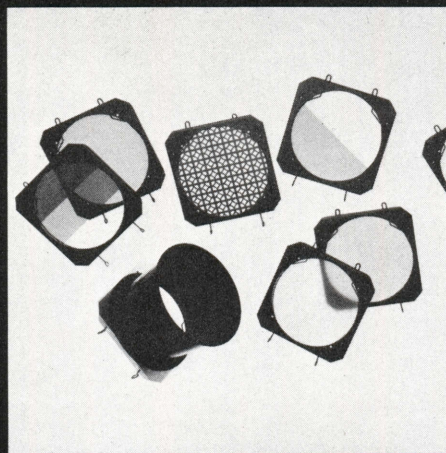
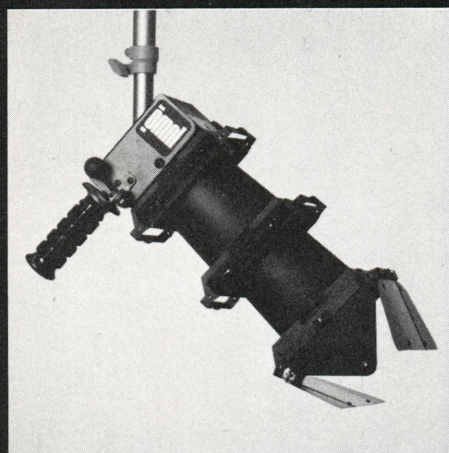
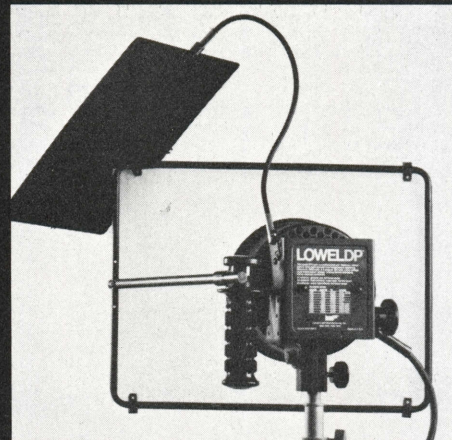
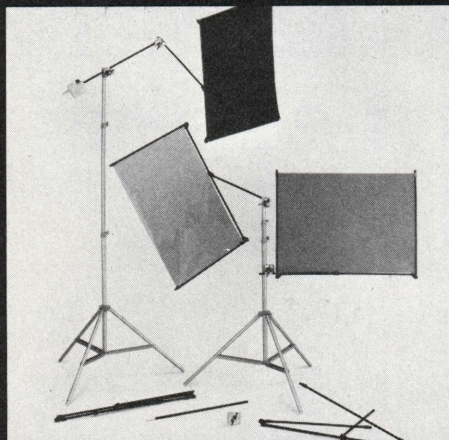
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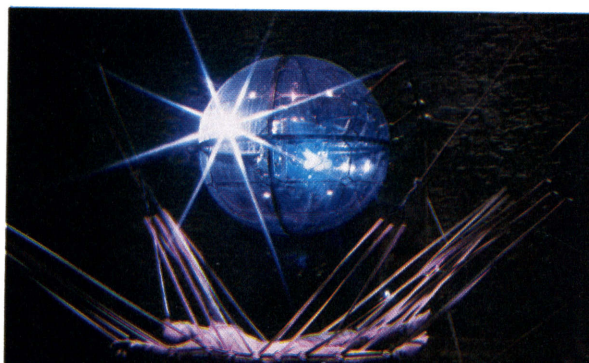


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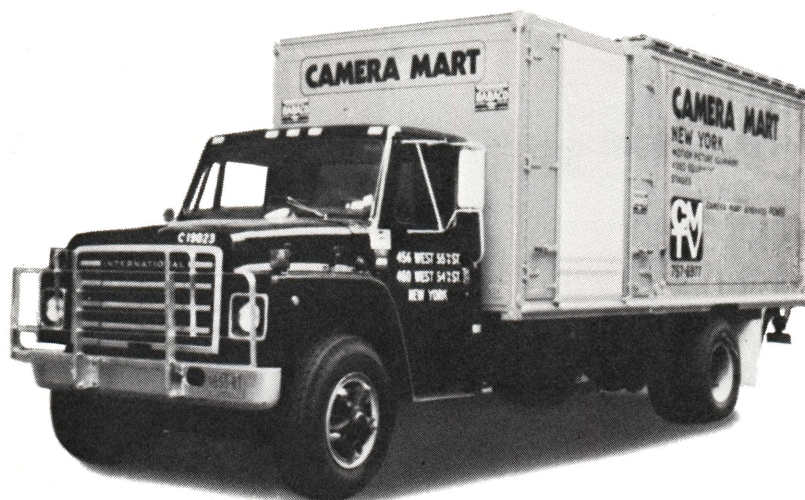
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On Our Cover:

The creation of a beautiful, living woman from lifeless clay is pictured imaginatively in *The Bride*, a new and different incarnation of the *Frankenstein* legend. (Photo by Bob Penn)

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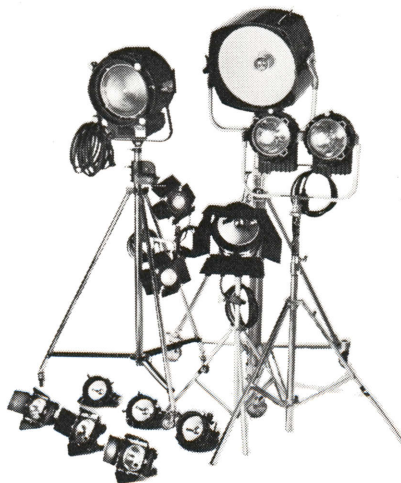


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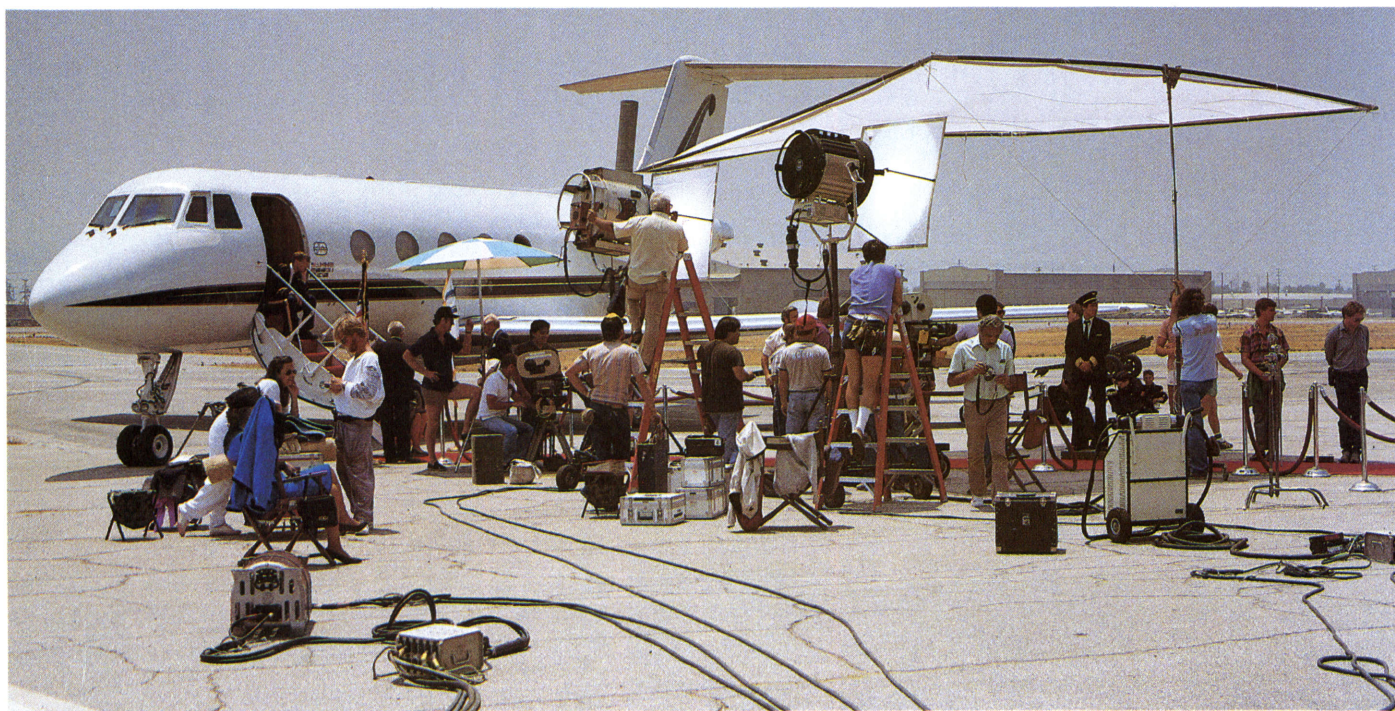


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We Regret . . .

Indeed! . . . We regret with apologies the consternation and furor over the unfortunate editorial appearing in the January 1985 issue of this magazine concerning the superior knowledge . . . cultural . . . and artistic backgrounds of foreign directors of photography and their employment vis-a-vis their counterparts in the United States, be they members or non-members of the American Society of Cinematographers. This mistaken and objectionable evaluation does not reflect the views of the American Society of Cinematographers—rather they were those of the editor.

In our sixty-six years of existence, the talents of our members have opened the windows of cinematic wonders to the world and with their images inspired and galvanized the potentials of hundreds . . . nor should we be less proud of our members' achievements—being the recipients of ninety two Academy Awards and over two hundred Academy Award nominations with volumes of accolades.

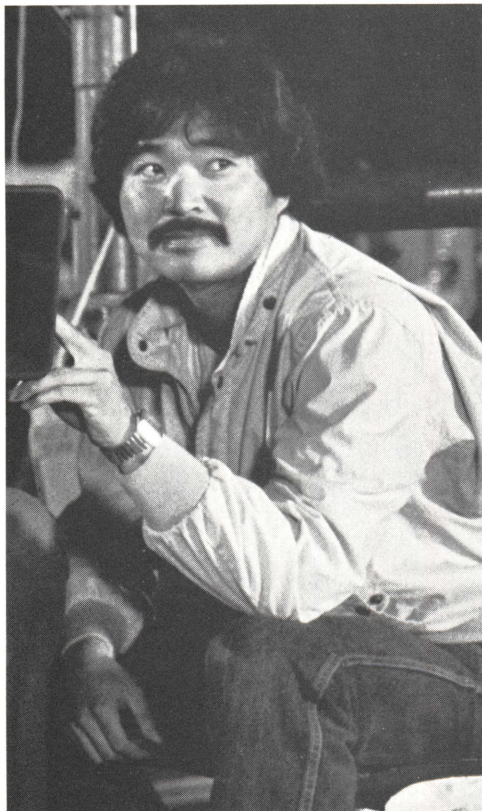
Let us not underestimate the knowledge . . . the cultural . . . or the artistic backgrounds of members of the American Society of Cinematographers and the long established worldwide respect for and integrity of the American Cinematographer magazine.

*Stanley Cortez,
President,
American Society of Cinematographers*

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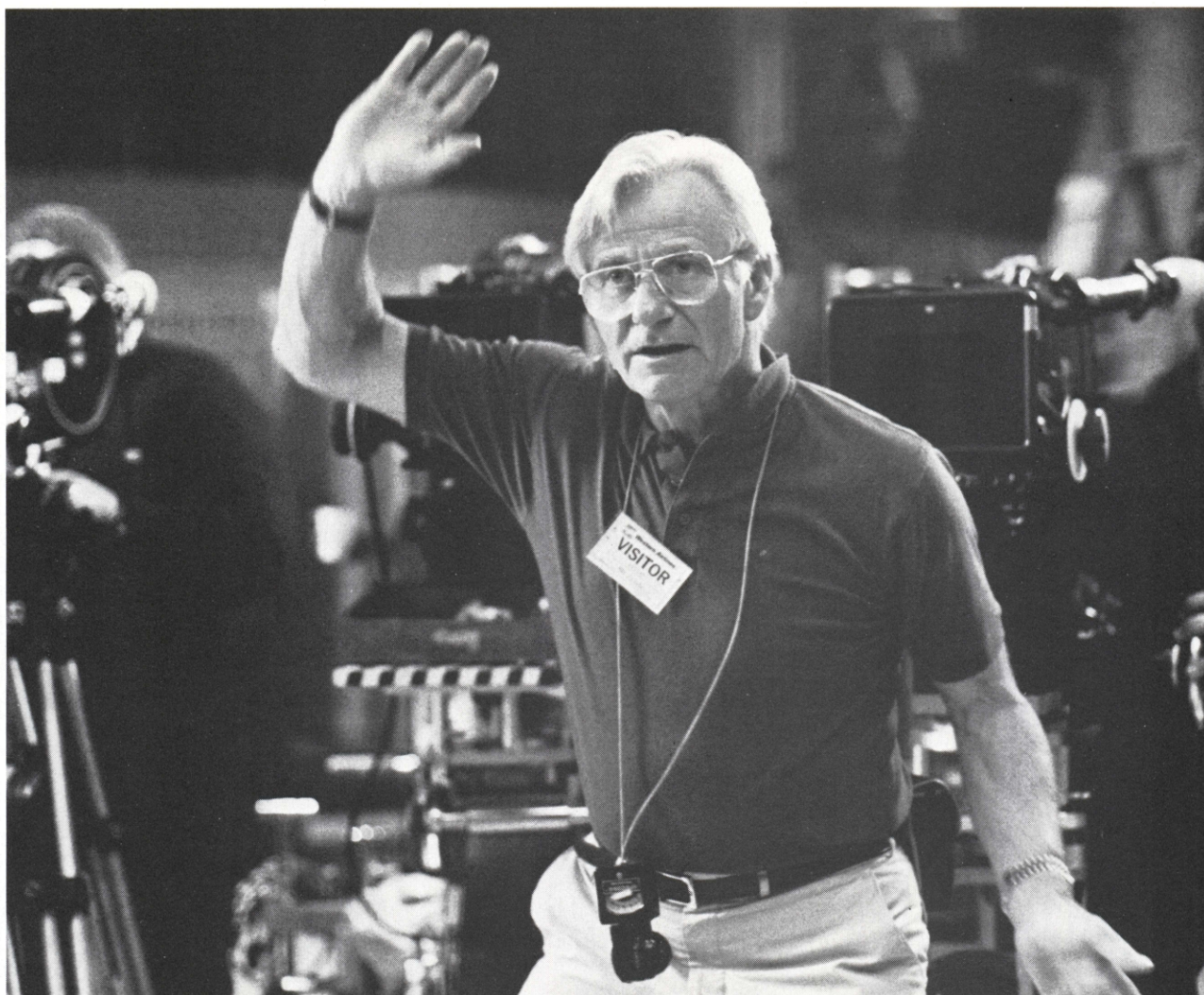


**First Assistant
Glenn Shimada**

“Because we used multiple cameras a lot, I had the extra job of Camera Coordinator,” says First Assistant Glenn Shimada. “I walked around with the Director and D.P. while they picked out camera angles.”

“Six cameras – no waiting!”

“Then I would radio their instructions to each of the crews – camera positions, focal length, subject, moves and so on. The crews had a standing joke: *Six cameras – no waiting!* and there was a lot of truth in that.”



Director Of Photography Robert Paynter B.S.C.

“We had about ten weeks of night shooting, all of it on location,” says Director of Photography Robert Paynter. “Clairmont’s backup was very good—delivering extra equipment to our crews in the middle of the night, sometimes at short notice.”

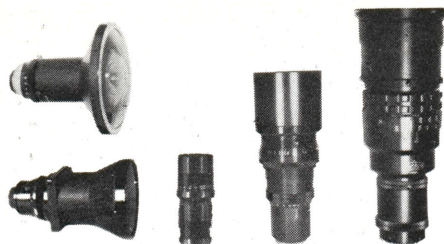
“Shooting with six 35BLs at once gave us better continuity control—with the violent crowd of extras at the airport, for example. We had to be in and out of there (and cleaned up) in a limited time, so it was very useful to get instantaneous multiple takes.”

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Letters

Widescreen Report

The new Iscovision 1.5x compression anamorphic system announced by Optical Radiation Corporation and reported in your November 1984 issue, has been used for about 15 years by amateur widescreen enthusiasts worldwide under the name Iscorama to make widescreen films on 8mm and 16mm films and also 35mm anamorphic projection slides. They are made by Schneider of Germany. In addition to the standard 2x compression lenses currently used in the professional cinema, amateurs also have access to intermediate 1.75x compression lenses made by Kowa of Japan.

—Tony Andrews,
Secretary, Australian
Widescreen Association.

Dinosaur Dither

It was enjoyable to see Nora Lee's listing of cinema dinosaurs in the article on *Baby*, but I would like to correct some erroneous information, and offer an opinion.

The Allosaurus in *The Beast of Hollow Mountain* was created not by Jack Rabin and Louis Dewitt, but by the Edward Nassour effects unit, for which Henry Lyon created dozens of sequential, rigid dinosaur models (one for each frame of film), plus a standard positionable model for close-ups. The Nassour Brothers also produced *The Boy and the Bull*, a fully animated puppet feature based on Willis O'Brien's story about a boy, his pet bull, and an allosaurus.

There were no dinosaurs in *At The Earth's Core*; nor did Roger Dicken work on that production. Dicken introduced rod puppet dinosaurs in an earlier film, *The Land That Time Forgot*.

The dinosaurs which Wah Chang built for *Dinosaurs - the Terrible Lizards* were animated for him by Doug Beswick.

I did not do any dinosaur effects for *The Planet of the Dinosaurs*, but I *did* design, sculpt and engineer the comic dinosaur miniatures for *Cavemen* (not David Allen as stated in the article). It was also I who "dared" to have the dinosaurs look humorous - the director had originally intended to have them be realistic in appearance. Animation was by Randle William Cook, Peter Kleinow, and David Allen (who also supervised the execution of the effects set-ups which I designed).

—Jim Danforth
Van Nuys, Calif.

We Blush

Words can not explain how much your fine magazine has taught me about the art of cinematography. Every issue is a new and informative course in the most important aspects of the filmmaking process.

Talking technically is one thing, writing it so the information is understandable and interesting is another. You achieve this high quality in issue after issue.

—Joseph R. Jobe
N. Huntington, PA

Collaborators

While it was extremely flattering (and I'm certainly not adverse to a little flattery now and then) Victoria Bugbee's article on *Stranger Than Paradise* makes it sound as if I were solely responsible for the look of the film. This is not entirely the case. I was aided by Paul Gibson (1st AC), Frank Prinzi (gaffer) and Jim Hayman (1st AC), all of whom are excellent cinematographers in their own right and without their talents the quality of the image could not have been achieved. This film was an intensely collaborative effort and these guys were in there all the way.

—Tom DiCillo
New York, NY



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The art and technique of cinematography are explored with rare understanding and expertise in **Masters of Light**. In interviews with 15 top directors of photography, Dennis Schaefer and Larry Salvato record the personal experiences, esthetic concerns, technical preferences and practical means of such outstanding cinematographers as John Alonzo, Nestor Almendros, Michael Chapman, William A. Fraker, Laszlo Kovacs, Haskell Wexler and their equally creative colleagues (*California U. Press, Berkeley, CA, \$27.50*).

Considered a top movie reference work, **Halliwell's Filmgoer's Companion** appears in a thoroughly updated 8th edition. Over 7000 entries cover world film personalities, movies, techniques and history in an encyclopedic sweep notable for its scope, reliability and expertise (*Scribner's, NYC, \$42.50*).

Edited by Bruce A. Austin, **Current Research in Film** (Vol. 1) surveys such areas of the motion picture industry as audience, economics and the law. Among topics covered are the marketing of *Star Wars*, drive-in theaters, the effect on film attendance of in-home entertainment and other significant issues (*Ablex, Norwood, NJ, \$26.50*).

A comprehensive study by Roger Hicks, **A History of the 35mm Still Camera** examines its development from the original 1912 patent to its current automatic exposure model. It covers in extensive detail camera controls and layout, construction, and lenses (*Focal Press, Stoneham, MA \$62.50*).

Director Edward Dmytryk and his actress wife Jean Porter offer professional advice in **On Screen Acting**, a specialized art and craft, distinct from stage acting, and governed by its own premises and techniques (*Focal Press, Stoneham, MA \$9.95*).

Peter Nichols describes in **The World of Fantastic Films** a large assortment of movies from *The Cabinet of Dr. Caligari* to *Superman*. His informative text and striking illustrations portray the genre's historic evolution, its leading directors, and an extensive filmography is provided (*Dodd Mead, NYC, \$22.95*).

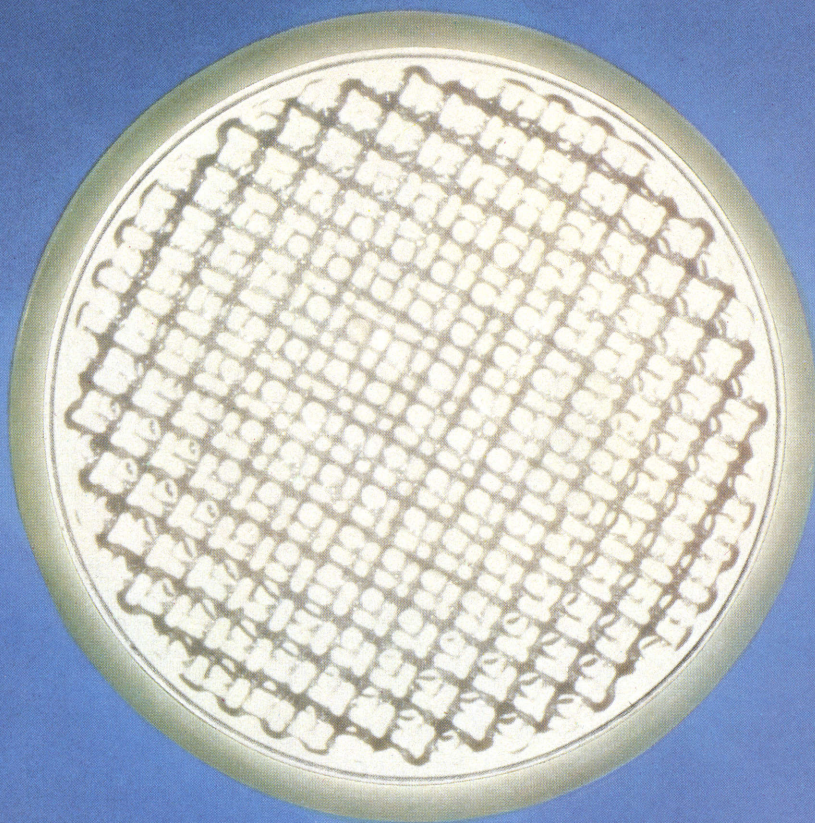
The distinctive style of musical scores created for science fiction, horror and fantasy films is expertly analyzed by Randall D. Larson in **Musique Fantastique**. This valuable reference work discusses the characteristics of this musical genre, its foremost composers, and specific films where the combination of the functional and the esthetic proves particularly successful (*Scarecrow, Metuchen, NJ, \$39.95*).

The strong socio-political ambience that pervades films from Eastern Europe is perceptively explored in **Politics, Art and Commitment in East European Films**. Ably edited by David W. Paul, contributions by filmmakers, critics and scholars analyze knowledgeably the themes, style and political messages of Hungarian, Polish and Czech films (*St. Martin's, NYC, \$22.50*).

Art director Eugene Lourie recalls in his lively memoir, **My Work in Films**, the main events of his life as they coincided with work on such movies as Jean Renoir's *Grand Illusion*, Chaplin's *Limelight*, and Ken Annakin's *Battle of the Bulge*. Lourie's description of the use of glass shots, miniatures, forced perspective and stop frame animation is invaluable in its technical virtuosity (*Harcourt Brace Jovanovich, San Diego, CA \$29.95/16.95*).

In **The Meryl Streep Story**, Nick Smurthwaite follows the struggles of an ambitious and gifted actress to achieve stardom (*Beaufort, NYC, \$12.95*).

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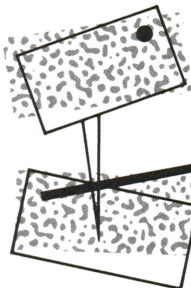
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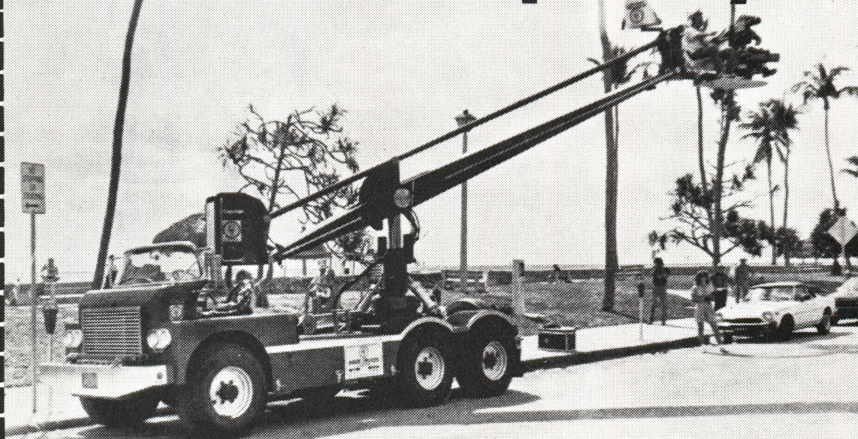
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Edited by Richard Koszarski with a selective eye for the unusual and the revealing, **Great American Film Directors in Photographs** offers generally posed shots of directors in situations characteristic of their calling (*Dover, NYC, \$9.95*).

Clive Hirschhorn's biography, **Gene Kelly**, is a factual, well-balanced and highly readable account of the performer's life (*St. Martin's NYC, \$13.95*).

A fearless exposé of the screen's meanies, tough guys, and bullies, **The Great Book of Villains**, compiled (not without humor) by Jan Stacy and Ryder Syvertsen, lists these fiends' dark motives and evil powers, and details the films in which they practice their dastardly deeds (*Contemporary Books, Chicago, \$13.95*).

In **Reel People Collection**, Kodak assembles 14 out-of-print issues of "Film Notes for Reel People" into a useful guidebook for professional film handling, projection techniques and theatre operation (*Kodak, Rochester, NY, \$10 + \$2.95 handling*).

Compiled by Granada Television, **The Making of "The Jewel in the Crown"** is an absorbing and detailed behind-the-scenes look at the filming of Paul Scott's *Raj Quartet* novel, now a distinguished PBS television series (*St. Martin's, NYC, \$14.95*).

Robert Dooley's sweeping panorama of American films of the 30s, **From Scarface to Scarlett** is an appealing combination of film history, popular culture and fond memories, as it evokes movies, stars and directors of a glittering era (*Harcourt Brace Jovanovich, San Diego, CA, \$14.95*).

A comprehensive and well-organized chronological record, Homer Dicken's **The Films of Barbara Stanwyck** covers the star in films, theatre, radio and television. Abundantly illustrated, it includes a lengthy biographical portrait (*Citadel Press, Secaucus, NJ, \$19.95*).

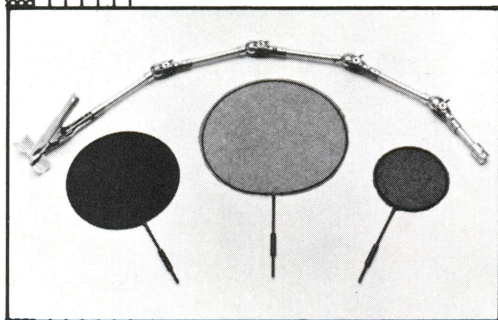
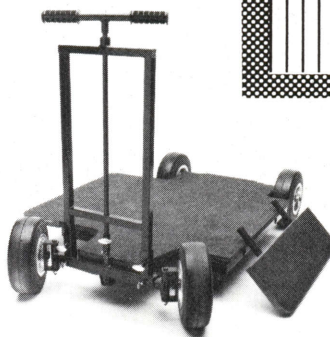
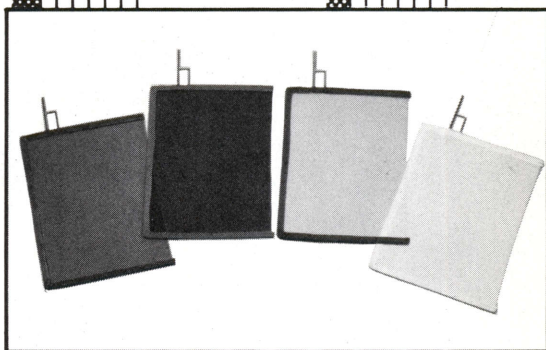
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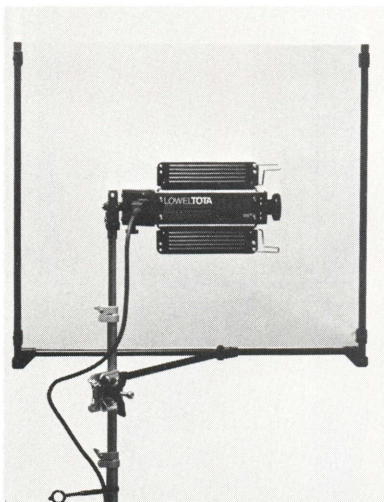
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New Standard Frame-Up

LoweL Light has introduced its standard Frame-up, a relatively large flag and gel frame that folds up compactly for storage and travel. Standard 20" x 24" gels can be attached with clips fastened to the frame corners. The gels balance or change the color of the light and reduce or diffuse it, while black and translucent mats can block or modulate light falling on the subject, background or camera.

The Frame-up mounts on any part of a stand with the help of the unique LoweL Lobo, and can be adjusted on every axis worth mentioning. As a result, it can go on the same stand that holds a light, reducing the number of stands and shooting space required, without sacrificing light control. When folded, the standard Frame-up fits in LoweL Tota/Omni cases that hold Omni stands.

A large Frame-up, 24" x 34" is also available. It uses the same LoweL Lobo for mounting and folds up to fit in LoweL DP, and some Softlight, cases.

For more details, contact LoweL, 475 Tenth Avenue, New York, N.Y. 10018 (212) 947-0950.

Darkroom in a Can

For the times on location when there is literally no place in which to load and unload film holders, reels or tanks, there is a new product called Darkroom in a Can.

The set is a series of small, collapsible, light-tight changing bags with a quickly assembled plastic framework to hold up the black fabric, keeping it away from the film. This allows for more working room in the bag. The "cans" come in three sizes, from 16"x17" to 36" square.

For more information, contact: Location Specialties, 3021-B Harbor Blvd., Costa Mesa, CA 92626.



Recording, Sync

The AXE KT-1000 is an extremely accurate, microprocessor-based, programmable digital metronome/synchronizer that will store 50 different user programmable tempos.

With the KT-1000 you can program various tempos to run for a specific number of beats; automatically start each tempo from SMPTE coded video tape, film, or audio tape; and not only put out a metronome pulse for live recording, but automatically control MIDI equipped devices, including accelerations and retards, so that everything runs in perfect synchronization.

Tempos can be entered into the KT-1000 in either beats per minute or in frames per beat. There are four frame formats: 24 (film), 25 (EBU), 29.97 (NTSC drop frame), and 30 (NTSC) frames per second. The duration of the

tempo can be entered in either the total number of beats or a specific length of time, accurate to 1/100th of a second (e.g.: 16 beats or 17.34 seconds). The KT-1000 can be programmed to go from one tempo to another automatically, accelerating and retarding as needed within a specific number of beats. Tempos can be started automatically from SMPTE Time Code off either video tape, audio tape, or SMPTE coded film. Besides putting out its headphone click, the KT-1000, through a MIDI interface, puts out the required number of pulses (digital words) to automatically control synthesizers, sequencers, and drum machines. The KT-1000 will also save and load the user's program to tape, or to a special, non-volatile, AXE memory card. In the first quarter of 1985 an add-on RS-232C computer interface buss will be available so that the user's program can be input from a computer or read out on either a computer monitor or printed out on a printer.

The KT-1000 is a tremendous tool for music editors, film, video, and television composers, synthesists, producers, choreographers, and recording studio engineers. For more information, contact: Artists X-ponent Engineering, P.O. Box 2331, Menlo Park, California 94025 U.S.A., (415) 365-5243.

Solar Battery Charging

A unique packaging technology combined with the latest generation of high output photo-voltaic cells has enabled PAG Power of London to produce the first viable on-board solar panels for ENG applications.

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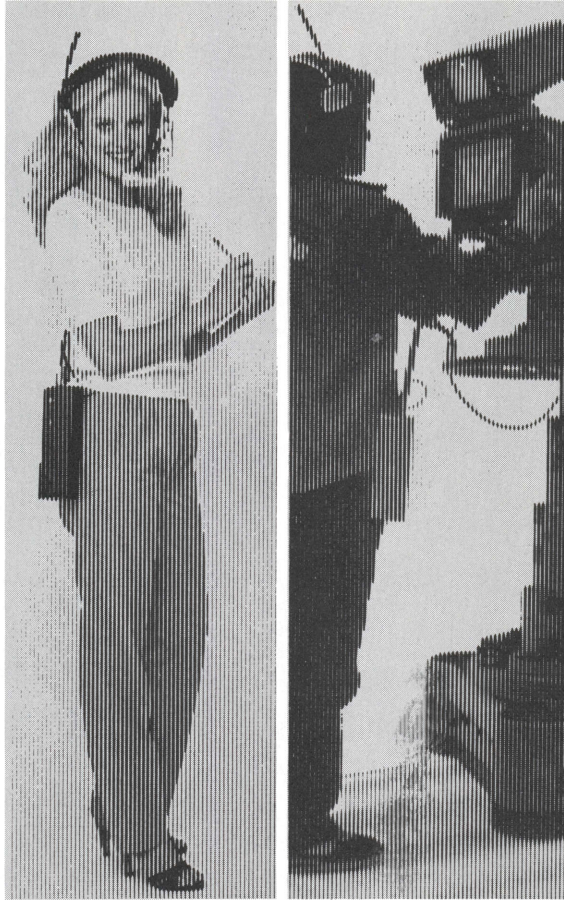
Another engineering development from SWINTEK to give you more channels without interference. Other makes only allow 1 system for each 1 MHz band, but you can use up to 8 SWINTEKS in 1 MHz band, at one time! No spurious noise, no interference, and total audio coverage in even the largest production situations. You get flexibility with SWINTEK.

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SWINTEK pocket-sized MARK 50A transmitters will accept almost any microphone as well as a line level sources such as an electric instrument. State-of-the-art technology in a compact, rugged metal case assure reliable, trouble-free operation.

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The unique design of the compact SWINTEK MARK QDC VHF Production Receiver, allows it to be easily integrated with ENG/EFP video or film cameras. This high quality receiver employs the same dBs companding technology as utilized in our top of the line SWINTEK AC Receivers, but is small enough to be mounted to a camera or slid into the battery compartment of the Sony Betacam. Available with or without transistor battery pack and offered with a selection of adaptor plates and cables to mount on most popular cameras and recorders, making the MARK QDC a natural for location film and video production.



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SWINTEK delivers true drop-out-free combining diversity for every model they make by an ingenious additive antenna system that blends the two signals in the carrier frequency rather than the audio section to deliver clear interference-free audio to the receiver.

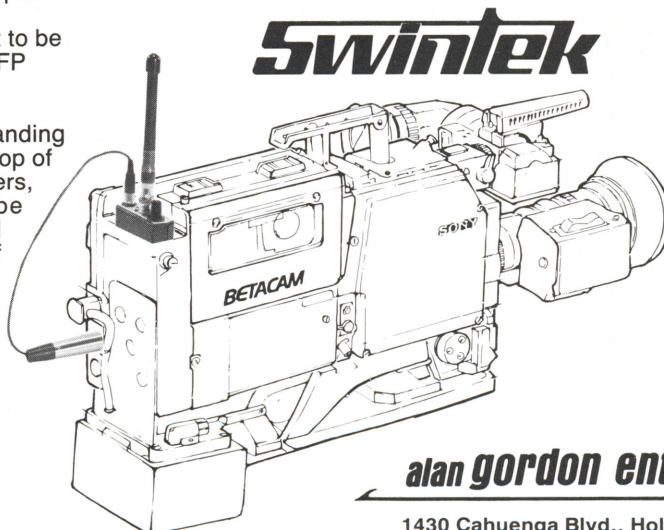
With the SWINTEK "Radio Frequency Switching Diversity" system (RFSD), two antenna signals are utilized for maximum benefit, but if a potential loss in signal or "buzz zone" is sensed, the system automatically switches antennas to avoid the "glitch."

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This unrestricted mobility is one reason why Betacam is the only one used to shoot the hit T.V. show "Lifestyles of the Rich & Famous." Frank Beacham of Television Matrix, the show's Hollywood production company, chose Betacam because "it's the only system we've found that celebrities welcome into their homes. Thanks to the Betacam, our crews have gotten incredible interviews that would have been missed with conventional video equipment."

Of course, the Betacam has reached other formidable places. Rock Solid Productions' Geoffrey Leighton used Betacam to shoot the behind-the-scenes documentary

of the Jacksons' "Body" video. "Betacam captured all the vibrant feeling and color of the production without getting in the way of the film crew; the Jacksons never lost a beat in front of the Betacam. It made all the difference."

Quotes such as these were prompted by more than remarkable mobility—Betacam's quality is equally astounding. Both the Saticon™ and new Plumbicon™ versions consistently render superior video. Because Betacam offers exceptional resolution, registration and signal-to-noise ratios.

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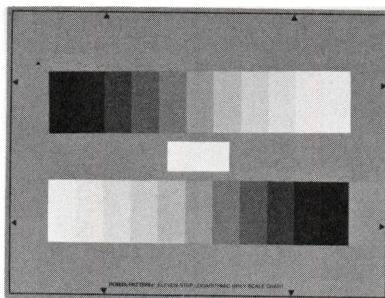
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to 200 ma. Larger panels with outputs up to 2.2 amps are also available. A rugged charging meter is fitted to the panel to indicate the panel output. The panel will produce a useful charging current whenever the recorder is in daylight even under a grey overcast sky.

The energy producing cells are hermetically sealed by a proprietary technique into a tough, scratch resistant cross-linked polymer which is strong enough to walk on. The Pagpanel is a self-contained unit totally water and weatherproof. The modules are made from carefully selected and matched photovoltaic cells which are designed, made and inspected to exacting military standards.

For further information, write to PAG Ltd. Power Division, 565 Kingston Road, London SW20. Telephone 01-543 3131.



11-Step Grey Scale

A new Porta-Pattern eleven-step grey-scale test chart has now been introduced for use with the latest color television cameras, which are capable of handling "brighter whites" and "darker blacks" than older models.

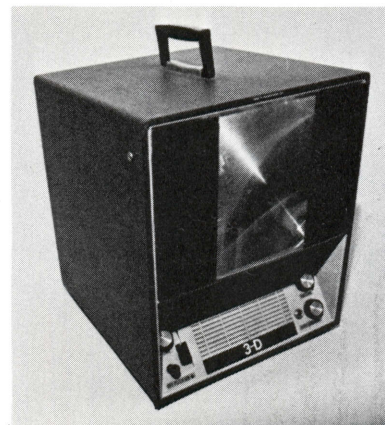
This chart contains an 89.9% high-reflectance center white bar for use in color balance adjustments, with two grey scales of 11 steps each running in opposite directions above and below the center white bar. These scales range from 83% white down to 2.7% black. Its reflectance range is considerably wider than that of the standard nine-step logarithmic grey-scale (60% peak white to 3% black), which has been in use internationally for more than 30 years.

The eleven-step chart meets the requirements of the ITE, where it is used for setting up the new generation of color cameras, including those used for HDTV. Its development, which has

been undertaken entirely by Porta-Pattern, involved considerable experimental work to produce 11 paint chips meeting the required close limits of reflectance error on a repeatable manufacturing basis.

The test chart is available as a 9-inch by 12-inch reflective chart for use in the Porta-Pattern system. It is also available as an 8-inch by 10-inch transparency for use in the company's spherical illuminator.

For further information, contact: Porta-Pattern Incorporated, P.O. Box 38945, 750 North Highland Avenue, Los Angeles, CA 90038, (213) 461-3561.



3-D TV

Didik TV Productions now offers a line of 3-D television and 3-D film systems, including the Didik 3-DTV-1; the Didik 3DP and the 3-DTV 101 portable TV system. All of the Didik 3-D systems play back in full color and are extremely easy to use.

The Didik 3-DTV-1 three dimensional television can be used with any conventional, un-modified video tape recorder (provided that the video tape was shot in 3-D). The system has a 19-inch screen and offers 300 lines horizontal resolution.

The Didik 3-DTV 101 portable TV system has a 5 inch screen and runs on batteries. It is ideal for location use in production, sales, medicine and other areas. The Didik 3DP is a film system using super 8mm cartridges offering maximum sharpness and ease of operation.

Programs for the Didik 3-D systems can be produced by placing a

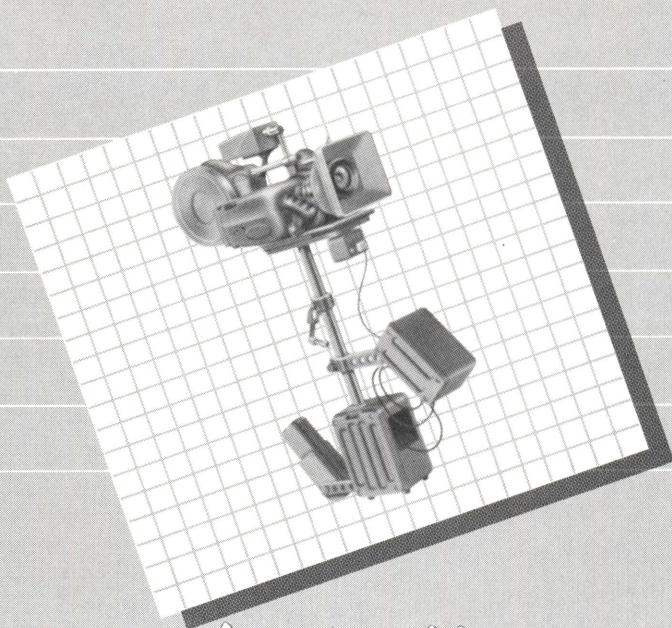


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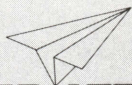
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relatively simple adapter over the front of the TV or film camera lens or by using a more complicated dual lens system. The illusion of depth can be increased or decreased during the production stage.

Didik TV Productions has been experimenting with 3-D TV and 3-D film for several years and has developed advanced hardware and new production techniques which enhance the stereo effect and increase viewer comfort.

For information, write to Didik TV Productions; P.O. Box -133; Rego Park,, N.Y. 11374.

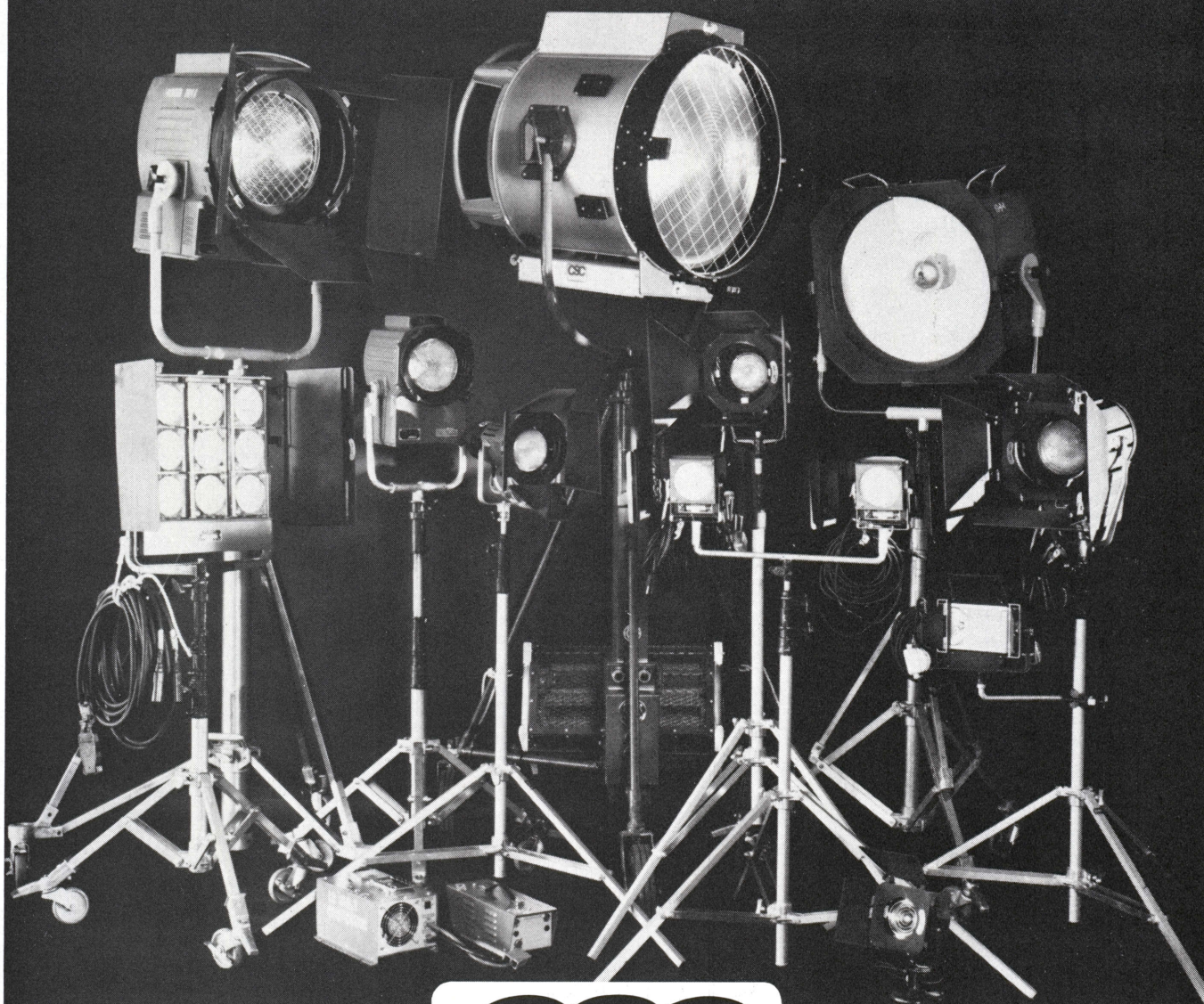
Mini-Collimator

The new lightweight (1½ lbs.), portable, yet rugged all-metal Kinoptik mini-collimator with soft lens adapter ring, is ideally suited for field testing of video, cine and photographic lenses, on film, mirror, ground glass, etc., even while using the 'camera - anytime, anywhere.

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For additional information, contact: Karl Heitz, Inc., 34-11 62nd Street, Woodside, NY 11377. (212) 565-0004.

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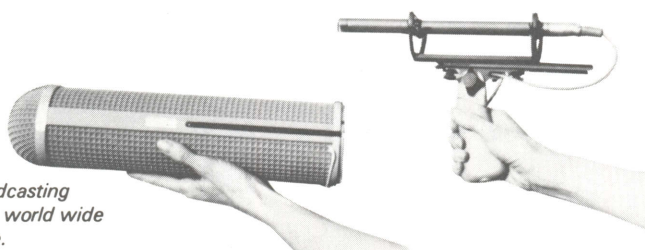
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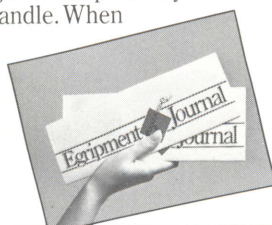
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Calendar

May

May 11, 1985

SMPTTE/USC Spring Seminar

Los Angeles
Stereo for Television
USC College of Continuing Education
(213) 743-7469

May 12-16, 1985

Society of Photographic Scientists & Engineers

38th Annual Conference
Atlantic City, NJ
7003 Kilworth Lane
Springfield, VA 22151

May 14-19, 1985

International Telecommunication Union

Singapore
Asia Telecom 85 Conference
Place des Nations, CH-1211
Geneva 20, Switzerland

May 16-17, 1985

Motion Picture & Television Engineering Society of Japan

17th Equipment Exhibition
Science Museum, Tokyo
Sankel Bldg. Annex 1-7-2, Otemachi,
Chiyoda-ku, Tokyo 100

May 18-19, 1985

Tahoe Film & Video Workshops

Cinematography & Lighting,
Dallas
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Truckee, CA 95734 (916) 587-4500

May 19-22, 1985

4th International Conference on Television Drama

Michigan State University
East Lansing, MI (517) 355-4714

May 19-23, 1985

Society for Technical Communication

Houston, Texas
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Ridgecrest, CA 93555 (202) 737-0035

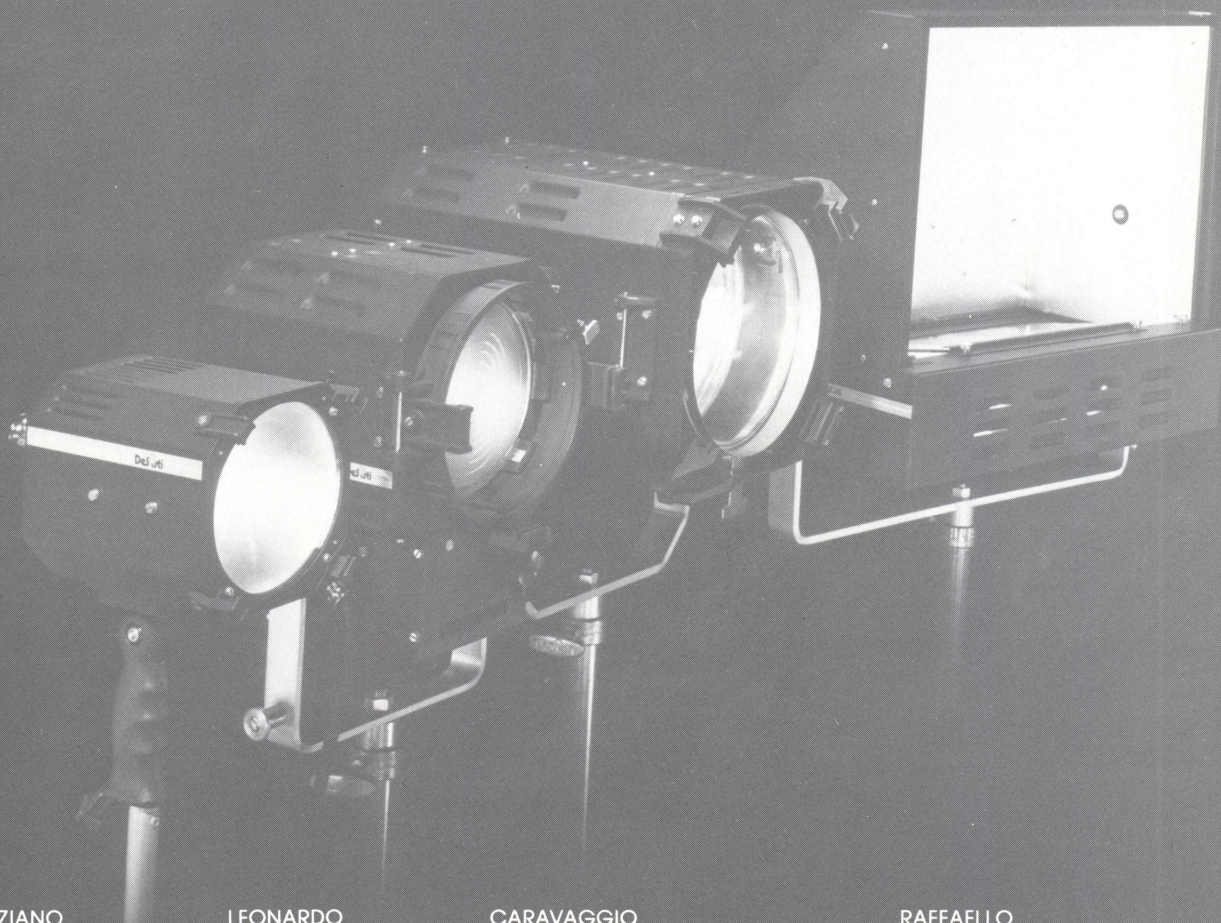
May 20-23, 1985

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June 2–8, 1985

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June 11–13, 1985

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June 16–22, 1985

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June 18–21, 1985

North American Television Institute Production Workshop

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June 23–29, 1985

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June 27–29, 1985

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how a scene shot on a drizzly day can be warmed up to fit in with other scenes shot in normal conditions. Lee also produce graduated corals 1 - 14.

The Lee range of coral filters is another example of Lee breaking new ground in filter technology. And of living up to its motto - Advancing Art through Advancing Science.

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Wind in the Willows: Children's Theater



Photos by Avis Mandel

Toad in his touring car.

The rowboat glided silently through the duckweed which dappled the surface of the small pond. With a quiet thud it stopped. "Cut! . . . OK, what happened?" echoed through the pastoral setting from a battery of speakers lining the shore along which the small boat containing two of *Wind In The Willows* characters was to have traveled. The question came from John Driver, television director leading a production team from Television Theater Company which was on location in the countryside outside of Minneapolis for shooting the English classic story of a group of animals and their relationship to nature.

"We hit a stump," replied one of the theater technicians for the Children's Theater Company of Minneapolis, who was himself covered with the pale green duckweed. "It's not easy sometimes, it's not exactly like working backstage," he said.

As one of the cameramen on this production the author had a unique chance to observe the transformation of an exterior location into a "shooting stage" for this elaborate production, 90% of which was shot on location.

TTC was born in 1981 from a belief harbored by TTC's vice-president and producer, Jonathan Stathakis. Having trained in feature films and documentaries for over ten years, Stathakis became interested in video in the late 1970's. He felt that "film people" carried a snobbery with them about film, and that "video people" wore blinders and couldn't see beyond their world of video. Jonathan decided to try an experiment by establishing a "hybrid" style of production. He combined what he saw as the "best" of film techniques and the "best" of video techniques with the "best" audio recording techniques and looked at it from a theatrical way of doing things! In ef-

fect, a repertory television production company was formed that lit for film, shot on video and recorded sound as if making an album. This group consisted of the same people on each production; the crew became the constant factor. By using the same professionals (the repertory theater method), TTC developed a finely tuned machine. The result was that the project became the "star", the main focal point. Not personalities or egos.

TTC's executive producers (and financiers) Ronald Tanet and Douglas Draper, both attorneys, fully supported the repertory approach and contributed their own brand of creativity to it. As a result, TTC has developed a "family" atmosphere, with a shooting style that they have been told is unlike any in the industry. Full 90 minute musical productions with casts of 68 people, or more, involving complex dance scenes have been shot in four

days – a feat that would have been virtually impossible with any other crew.

To John Driver, the challenge was to take *Wind In The Willows*, which Driver called one of the “prime examples of prose capturing the spirit of the environment of nature” and do just that . . . capture that spirit on videotape. The play had been selected to be part of the summer season of the Children’s Theater Company of Minneapolis. In June, 1982, TTC and CTC collaborated to videotape in Minneapolis, *Alice In Wonderland* and *Puss ‘n Boots* under a contract with Universal/MCA in Hollywood. Both dramas had elements taped on location, in the case of *Alice* the beginning and end of the play were exteriors in the Twin Cities area. *Puss* had scenes taped in New Orleans to introduce it. In both cases, shooting had taken only part of one day, and much was without location sound. The experience gained by shooting these scenes on location was a major factor in deciding that *Wind In The Willows* could be shot on location. Driver and the theater’s director, John Donahue, wanted to convince Universal that it could be done for the same cost as if it were shot in the theater. TTC executive producers Ron Tanet and Doug Draper were enthusiastic about the location approach, but had to sell Universal on the idea first. Their feeling was that the production values of an exterior location would enhance the value and marketability of the show. Planning sessions took place with the assumption that it would be approved. A screenplay adaptation was written by Sharon Holland for CTC. Locations were scouted by CTC’s Frank McGovern within an hour’s commute to Minneapolis. Costume design was started. This was one of the critical areas combining realism with stylization in order for the play to translate well to television.

Because the time frame of the play spans one year, John Driver wanted to shoot during the

winter as well as the summer. Funding had not yet been approved as spring approached. Putting off the shooting of winter scenes until the next season would jeopardize the scheduled delivery date of the show. By March, the stage play had just been cast, no one had as yet rehearsed, but cast and crew were put on “hold” for the funding approval and the next snowfall.

Word flashed from Hollywood . . . GO! With the last snowfall of the year just on the ground Driver and Stathakis flew into Minneapolis and with a single camera unit shot scenes of “Ratty” and “Moley” on a journey to Badger’s home. This entailed multiple camera setups with “fall” scenes achieved by framing the bare trees with no snow. The actors had just been cast for the show, and were just being fitted with costumes. The hookups that allow ears to move and eyes to blink had not been made yet for the “Ratty” and “Moley” costumes, and more detail would later be added for the summer shoot given the way that the costumes looked on camera. As a result of the decision to videotape this play, the stage sets were designed and built to be very realistic, as opposed to stylized. Great attention to detail was taken with the badger den set for example. Adaptations of the script were made, dialogue was trimmed in some cases and dialogue added that might take place while walking as opposed to a static scene on stage. There is in the show a “May Day Dance” sequence which was, for the most part, done as an improvisation.

The location for the winter scenes had to be the same as for later shots because in the script the two animals “Ratty” and “Moley” go to sleep in the fall and wake up after a snowfall. By shooting the snow scene first, Driver could dissolve to the sleeping and waking scene from the scene of the animals shot during the summer. Victoria Farms was the choice for the location, satisfy-

ing Driver’s desire for all locations within the same general area to allow for coordination of men and material, actors and technicians moving from one site to another. The farm consisted of 600 acres of woods, plains and lakes and was located 45 minutes southwest of Minneapolis. Both John Driver and CTC felt that it came as close as possible to representing the English countryside. There was only a rudimentary road system in place which made four-wheel-drive vehicles a must. The owner supplied tractors and drivers to haul the setup and prep crews as well as actors from one setup to another, and even to haul the school bus used to transport us to and from Minneapolis out of the mud!



Seated: John Donahue, theater director, with John Driver, television director. Below: Moley leaving his hole.



Some friends of Ratty.

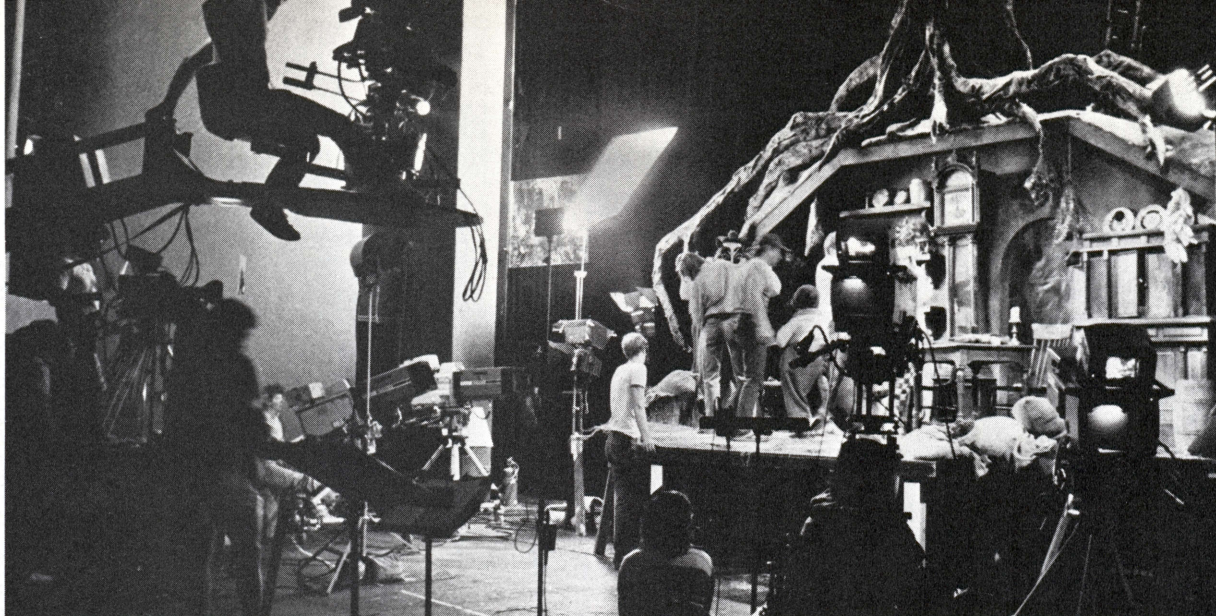
A great deal of time had gone into the making of a shooting schedule. Because TTC was shooting another play, *The Red Shoes*, after *Wind In The Willows* and needed to book a remote videotape unit, a firm time to start the second play had been locked in. Although 90% of *Wind* was location footage, some interiors, e.g., Badger's den, had been constructed on the theater's stage. One day was allowed for the taping of the interior scenes, then the stage was to be turned around overnight with a new set for *The Red Shoes*. Assistant director Jill Henry drew up the strip board and gave everyone the bad news. Eleven straight days in order to shoot both shows, no cover sets, and the mosquito was the state bird of Minnesota. The schedule tried to minimize lengthy moves from shot to shot which meant shooting the play out of sequence. The idea was to have a "prep" crew at the next location prepar-

ing it for the "shoot" crew to arrive. Marilyn Katz was the production manager for the shoot. It was her responsibility to get everyone to the location from Minneapolis and then to get everyone to the actual shoot location. She had four vehicles and drivers under her command and even one dirt bike. Walkie-talkies were used throughout the shoot, but they had only one channel and in addition, they couldn't be used around the cameras during taping because of radio-frequency interference in the video. The typical shoot day contained 25 setups, started at 8 a.m. and wrapped at darkness (or beyond). The hardest days were scheduled first, with the need to get certain shots when the sun was at the best angle for shooting. For example, shooting with a pond in the background, the video cameras would have had trouble handling sun reflecting directly off the water. With the child actors in costume, in the sunlight it was hot enough. Adding reflectors, which

was necessary made it possible to work for only relatively short periods before giving actors a break. Fortunately, shooting in the Northern latitude in June meant that there was maximum duration of daylight. With the amount of exteriors, there were no cover sets, as it would have been financially prohibitive to have a five camera remote truck on standby. The scenes that could be shot in the rain were scheduled last to allow for some rain. And on the last day of shooting outside, it did rain. Raising the video levels a little higher, the scenes do not stand out particularly from a continuity point of view.

John Driver wanted to use two cameras for coverage in every scene. He had found from previous experience that it could give him a maximum of coverage with a minimum of time. Instead of doing every scene at least twice for master shot and closeup he could get both in one pass. If the take was good for most of the action, he could do it again and, changing angles, get four different angles. John Heller and I, who were the camera operators, had worked with Driver before. He knew our capabilities, and we knew his style. This is one of the key elements that made this shoot work and work well. The crew worked as a unit. We knew each other before the shoot, and were totally involved during the shoot.

Two actors, playing "Otter" and his "son", are emerging from the marsh reeds, while "Ratty" and "Moley" are coming down a hill towards the pond, to sit at the base of a log for a picnic. In scouting the location, CTC crews had found the log some distance away. As the first order of business for the "prep" crew, the log was brought to the site, and the position set by Driver. Actor positions were then given, and camera positions set. Jack Malick, director of photography, set his reflectors to light the characters coming down the hill out of shadow into sunlight. Other reflectors lit the two characters by the marsh. The sun was high in the sky



Typical shooting setup for Children's Theater

at the time of the shot, so there were shadows that had to be softened. Throughout the shoot, Malick accomplished this by using reflectors and HMI lights in combination. With the exception of one day's shooting, all dialogue was looped. Two actors sat off-camera in front of microphones feeding a PA system and read the dialogue. This track was recorded on one of the audio tracks of the 1" videotape. The actors "on-camera" would "mime" the appropriate words and gestures. Later, after the video editing was complete, a looping session was held, with the "readers" listening to the recorded track, watching the picture and adding ad lib sounds where necessary. The costumes were sophisticated in the technical sense of having nitrogen-driven movements for ears and eyes, and that fact, combined with the actors dealing with new space for their actions meant that some rehearsal was generally necessary for the "readers" and actors to get "in sync". This was done while the cameras were being set and the lighting touched up, so as not to delay shooting. Economy of time and motion was the order of the day ... and they were long days!

Technical equipment consisted of two Ikegami HL-79 DAL cameras with 14:1 zoom lenses, O'Connor 100 fluid heads with ball mounts, Peter Lisand

aluminum legs and baby legs. I chose to use the studio configuration for my camera, Heller chose the eyepiece, each for essentially personal reasons, except in the case where John would do an occasional hand-held pickup shot. It was my feeling that working long days it was easier on my eyes to use a viewfinder, and that sometimes, with a less rehearsed scene it was important to be able to "see around" the camera, instead of having my head down, to adjust for actors coming into frame for example. Each camera fed its own 1" VTR which had its own time code generator. Both camera and tape machine were battery powered. We ran about one hour on each battery and we always had a spare at the camera to minimize downtime. Only two takes were bad during the week of shooting due to batteries going out during the take.

The director had two monitors set up, each looped through the tape machine so that he could see both angles at the same time. They were small 9" color monitors and the viewing conditions were less than ideal, especially in the sunlight. One of the advantages of working with videotape of course, is the ability to play back what was just shot, if there was any question on coverage. Previous to shooting, Driver and Malick had discussed the "look" of the show and the possible use of filters. The decision was

made to use a Tiffen diffusion #1 filter on both cameras, and in many cases to work on the tight end of the lens to have a more diffuse background. Much of the show consists of wider shots, so the filters were necessary to achieve a softer look. Fog filters and "smoke" were used in a "fantasy" sequence for special effect.

This brings up one of the biggest problems that we encountered: the maintenance of quality in the video signal. The decision had been made not to go with a remote truck on location for both the additional expense and just the sheer logistical problem of getting it around. A small ENG type truck would have been a better alternative than what we ended up with. The video engineer was shading, using two different monitors, instead of being able to switch between cameras on one. Consequently, scene-by-scene color correction was necessary in post-production to match the cameras. In addition, the video engineer did not have access to either a vectorscope or waveform monitor during the shooting, so that detection of "white clip", for example, became dependent on proper monitor set-up. As cameramen, we tried to keep the exposure problems to a minimum by our framing of backgrounds, but in many cases the backgrounds were just too "hot" for the video

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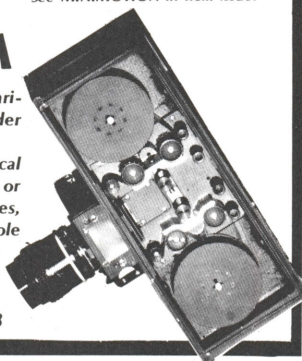
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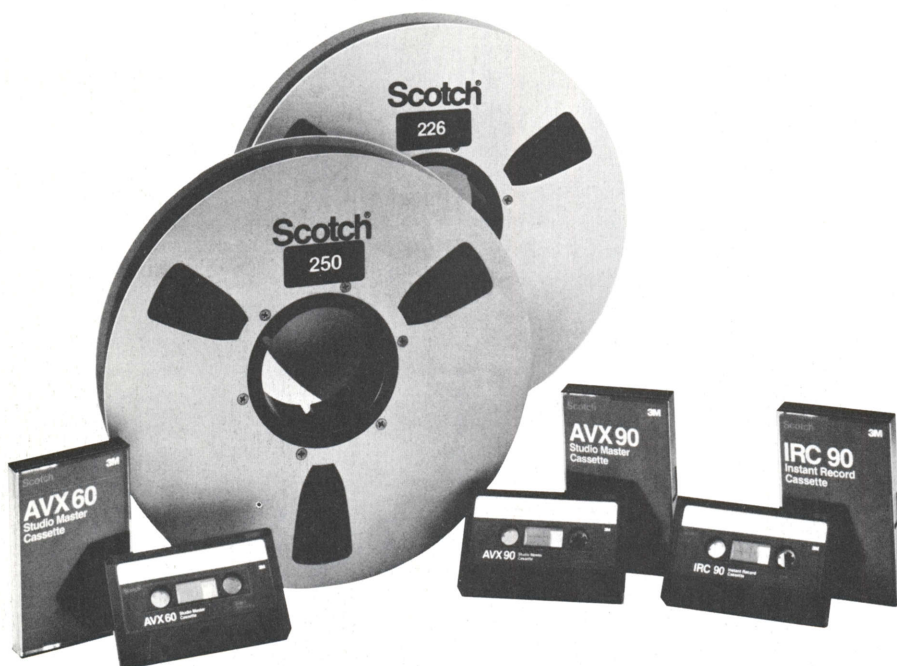
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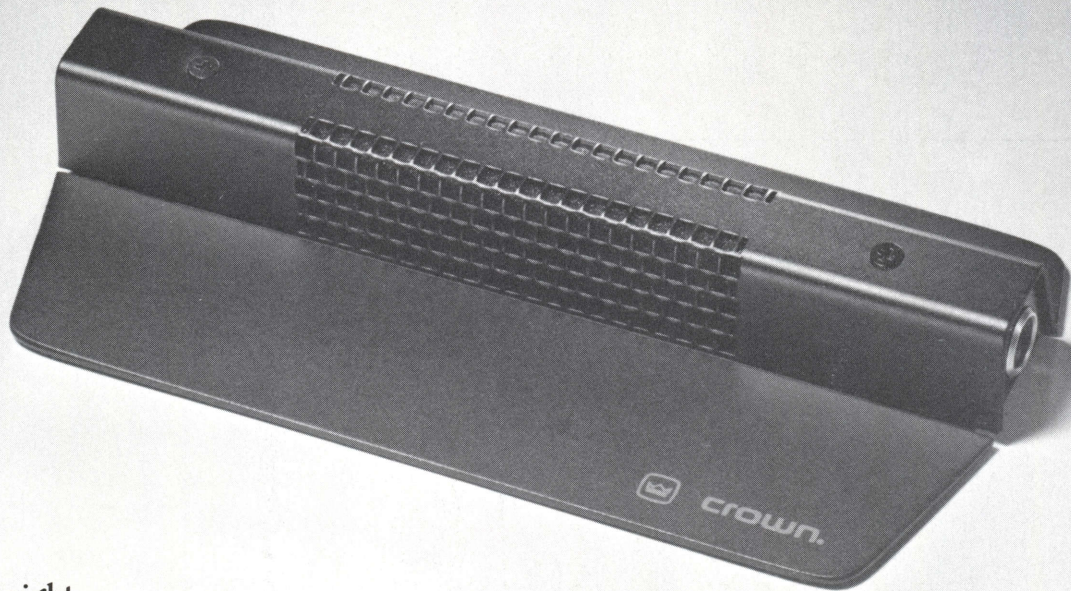
camera to handle. We would either stop and re-balance the foreground light levels, or else let the background clip slightly and plan to use a "soft wipe" in post-production to "airbrush" the clip out. This was preferable to having the iris run in "automatic", because the lens tended to iris down if something bright came into frame.

There was no downtime chargeable to equipment. The cameras worked perfectly in the day, shielded by portable umbrellas and in the cool of night. There were some videotape problems due to the number of insects drawn to the site of our night shooting by the lights and "shower curtain" diffusion material for the HMI's. They seemed to act as a "beacon" for every Junebug in the county and one found its way into the tape machine! Not having location dialogue meant that lighting could use generators freely around the set with a minimum of consideration. Experience with shooting *Alice* exteriors had taught that without having to record location dialogue there could be more set-ups possible throughout the day. Outdoor "effect tracks" were recorded for the mixdown later.

The key factors in the success of this project were the ability to pre-plan the shots, and putting together a "unit"; equipment and crew, necessary to get those shots. It is possible to get a crew together that does not stand around waiting for the next meal, or computing how much overtime they're going to make. Taking *Wind In the Willows* as literature and turning it into images on a screen was rewarding. ■

Jay Millard began work in television as a cameraman in 1966 for Connecticut Public Television at Hartford. In 1975 he moved to New York where he worked as a cameraman and also directed some of ABC's "Edge of Night" series. He was part of the camera crew which won an Emmy for the series in 1979. He is active as a cameraman now for the Metropolitan Opera and Home Box Office.

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Danger in “God’s Country”



Nell Shipman with Brownie the bear, a pet she acquired as a cub and kept for many years.

This story is excerpted from the book, The Light on Her Face, published by The ASC Press, written by veteran cinematographer Joseph Walker and his wife, Juanita. Noted for his many inventions and his photography in some 160 feature movies, Walker was born in Denver in 1892. He pioneered in radio and electronics, beginning as assistant to Dr. Lee DeForest in 1910, making the first news reports via wireless in 1911. He built the first wireless transmitters for airplanes and autos, established the first retail wireless store department, and reported by wireless from the battlefronts of the Mexican Revolution. His first feature was Back to God's Country. Among his later films were It Happened One Night, Mr. Deeds Goes to Town, Lost Horizon, You Can't Take It With You, Meet John Doe, Only Angels Have Wings, His Girl Friday, The Jolson Story and Born Yesterday. He holds the first zoom lens patents. Other notable inventions include the Williams Composite Photography System, a comparator exposure meter, a panoramic television camera, an aerial image device, the RCA Electra-Zoom Lens. Retired, he and Juanita, a professional writer-photographer, live in Las Vegas, Nevada.

CLICKING train wheels gained momentum as a special Pullman on the Southern Pacific Railroad – reserved for the Shipman-Curwood motion picture troupe, plus an entire baggage car housing their equipment – pulled out of Los Angeles early in February, 1919.

Nell and her business-manager husband, Ernest Shipman, along with self-assured James Oliver Curwood, the noted author of adventure novels, held the center of attention in this deluxe Pullman. Mrs. Curwood and Nell were the only women traveling with us. Not even a wardrobe mistress or hairdresser was present – something of a novelty for a leading lady. As her cameraman, responsible for how she looked on the screen, I should have been concerned but I wasn't. I admired this down-to-earth realistic woman. Besides, this was my first motion picture of importance.

Across from me lounged the leading man, Ronald Byram; a tall darkly-handsome Australian, young and full of fun. He celebrated our departure with repeated samplings from a flask (these were prohibition times) and quipping "... gotta take my medicine."

Bert Van Tuyle, in his personable way, traipsed the aisle, charming each and all. He had been named production manager with a chance to direct the action scenes.

David Hartford of the New York stage was the official director, and his assistant was Gavin Young – a chap I recommended at random from a list of available assistants, merely because his name sounded like that of a good Scotchman. I've known of careers being launched for lesser reasons.

Also, it became my responsibility to hire the second cameraman, and through certain circumstances I acquired the highly-regarded first cameraman, Dal Clawson, to act as my second. Here's how it came about:

Second cameramen were required for business purposes. High export and import duties made it necessary to have two negatives. With tariff being figured on a footage basis, producers found it cheaper to export a complete negative than pay duty on several prints. Thus, two cameras were used; one the so-called American negative, one the foreign. Being first cameraman, I directed and became solely responsible for the photographic quality. The second cameraman simply followed my orders.

It became my job to find this second cameraman; someone competent to follow orders, but also willing to do it in the bleak frozen north in mid-winter.

Finding him wasn't easy. Good men weren't available. And I couldn't take a chance on the inexperienced. As usual, I turned to Bitzer; he suggested I ask Dal Clawson if he knew of someone. Clawson had just finished a big picture for Lois Weber.

I collared Dal and explained my problem.

"Whoever I get will have to put up with some rough conditions," I told him. "We'll be miserably cold. And probably live on moose meat."

He didn't answer; I figured he was trying to think of someone. He looked thoughtfully at me a long moment, then asked, "Who's going to shoot the moose?"

I shrugged. "I dunno. Probably a guide. Or some Eskimo."

He grinned cunningly. "If I can shoot the moose – I'll take the job myself."

The prospect of having the great Dal Clawson as my second cameraman, taking orders from me, seemed unbelievable. But here he was; traveling with us in that special car.

Remaining in our group were: Wellington Playter, a big-faced beefy actor, cast as the villain; two character actors, William Colvin and Charles Arling (the latter regaling us with stories of his experiences playing in Pearl White serials); and Peter Graff, a moody Russian with a Van Dyke beard, the owner and trainer of a pair of large dogs housed in the baggage car and important in the story.



Joseph Walker, ASC

We stayed in the luxurious Palliser Hotel at Calgary in the Province of Alberta, Canada, our last touch of comfortable living before pushing toward primitive country.

(To those wondering why our company would undertake this far off location in winter, there were more reasons than the prospect of authentic background. First, the picture *had* to be made in Canada because it was financed by Canadian money. And why the Arctic? James Oliver Curwood's contract stated he had the right to pick the locations; he insisted Slave Lake was like the barrens in his story. Many of us argued it wasn't necessary we go this far, but he remained adamant.)

The Canadian backers met us at the hotel. After a congenial meeting, Ernest Shipman bade us farewell to return to Los Angeles. His next order of business: arranging for distribution of the film.

Nell appeared relieved and glad to see him leave. In the few days we'd traveled together, I'd learned much about the tense drama taking place between her and her husband. Shipman was dominant and surly. Many times I saw hurt and resentment in her eyes when he put her down before others. But now with him gone, a proud tilt had returned to her chin.

Before checking out of the hotel, Van Tuyle used his persuasive power to lure Sam Wong, a Chinese cook who spoke little English, from the hotel staff. Sam brought numerous tins of herbs and spices, plus a large array of pots and pans.

In Edmonton we were met by Charlie Burkhart, a strapping man with a full beard and enormous shoulders: our liaison, guide, buffer from now on out. First off, he outfitted us at Hudson's Bay Company with hooded fur parkas, fur gauntlets, parchment vests (worn as windbreakers under Indian blanket mackinaws), thick felt socks, and buckled rubber overshoes.

He instructed us never to wear leather shoes outdoors (not even under rubber overshoes), as leather would freeze and cause serious damage

to one's feet. Also, we must not breathe deeply of the Arctic air for it could freeze the lungs.

We journeyed north on the little E.D.& P. (Edmonton, Dunvegan and Pacific) narrow-gauged railroad. The ride became increasingly slower and jarring, with no resilience from a roadbed right on the frozen tundra. Warmed by a birch-burning stove at one end of the toy-like wooden car, we didn't complain; we joked about our adventure as we rattled along.

At a point best described as "nowhere," our seemingly endless trek simmered to a halt. Dog teams awaited us in a snowy setting of brittle cold.

Charlie Burkhart took over. With remarkable thoroughness, he assigned us to sleds and directed the unloading of our equipment. Soon we were each tucked snugly in a sled and securely fastened. We pulled the thick fur parkas about our faces and kept our hands buried in the warm gauntlet gloves. Then, a crack of the whip – and with incredible swiftness, the whirling-tailed, frisky malamutes took off with us into a stark, bleak wilderness of dazzling white.

Our campsite consisted of fishermen's shacks built of raw pine boards with gaping cracks and a cookhouse on the shore of Slave Lake. Both shore and lake were under a thick blanket of snow.

Our first major disappointment came when we learned only two cabins had stoves. It was decided that Nell could take one; the Curwoods the other. Added army blankets were given to the rest of us. And we found later it was necessary to put as many blankets under us as on top. The temperature that night registered forty degrees below zero.

I was too keyed up to sleep. This was the eve of my first big motion picture. I stole out of the shack at about eleven, heavily bundled in fur, my face all but lost in the thick mass of a long-haired parka. I pressed the fur to my nostrils to retain body heat and remembered to breathe shallow. The rugged smell of tanned hide and walrus oil was not unpleasant. My eyes became accustomed to the darkness. I was suddenly transfixed by what I saw.

A picket fence formed in the black sky; fingers of pale yellow and white shot up one at a time and stretched fan-shaped across the northern horizon. They pulsed in delicate hues while the spectacle held. Then, as at a given signal – all went down together, like a collapsing fan.

A drawn curtain of rich darkness blanked the night. Was the show over?

Slowly a heart-shaped design formed. It glowed in tones of dark magenta, mauve and orange. The pattern throbbed and rolled in slow motion, changing form and color. It reached a zenith of brilliance, then disappeared as a slide being pulled from a projector. Again an interval of darkness ensued. The picket fence returned.

Aurora borealis!

If only it could be photographed! No point in trying; that magnificent light was too delicate to capture on film. (Film, that is, of those days.)

I watched as long as I dared. Returning to the shack I crammed newspaper chunks in whistling gaps between the wall boards. Wrapped in a cocoon of army blankets, I was ready for sleep. And so deep was the sleep, I knew nothing 'til awakened by Dal Clawson's exuberant voice in the early dawn:

"Let's try Sammy Wong's cookin'! He's frying fresh-caught white fish. They jus' cut out a hole four feet deep in the ice, drop in a line, and pull 'em out!"

The first day was spent making exposure tests. We had no meters at that time, hence the tests. I knew I must be most accurate, for all about us was reflected light. The sun skimmed along the horizon and stayed right there; at 10 a.m. I decided that was as high as it was going to climb.

The oil from our two Bell & Howell cameras had been removed before we left LA. It was replaced with a mixture of kerosene and refined walrus oil, such as used in ship's chronometers in the Arctic. On expert advice I was told to leave our cameras outdoors at all times in this climate, covered with tarp when not in use and tied down for protection against the wind. For, bringing them indoors after exposure to colder temperatures would cause lenses to sweat between the elements. And if this occurred, the moisture would then freeze if returned to the cold.

I made several test strips of that vast white expanse. Everything was shot at $f/3.5$. – and if there's a question *why* I shot everything at $f/3.5$ – there was a necessary but embarrassing reason:

Despite my eagerness to drain every last bit of oil from the two cameras, I completely overlooked the all-important layer of oil in the lens diaphragm! I stood in this fiercely cold wilderness cussing myself. The iris diaphragms in both cameras were frozen wide open at $f/3.5$.

I dared not risk changing the setting for fear of shearing the delicate pins of the iris leaves. And to attempt thawing would only sweat the lens as I've already mentioned. I resorted to the alternative of varying the shutter opening to give a choice of exposure—knowing full well this could be critical, for cutting the shutter opening a trifle too far would cause flicker.

I shot the tests and hoped for the best. Dal Clawson wasn't around to consult; already on this first "easy" day he was off with some new-found buddies looking for moose. I had to remind myself that was the dangling promise responsible for my getting this big-shot cameraman.

Then and there I decided I wouldn't tell him what happened. I'd calmly assume my role of authority and tell him pointedly:

"Shoot everything at $f/3.5$. And *don't* change that setting!"

I rigged a makeshift darkroom of tar paper walls in one corner of the cookhouse. Sam Wong kept a fire stoked in the big black range. I explained to

Sam I needed water heated for my chemicals. He nodded but I had no assurance he understood. I surmised, however, he knew more English than he let on, that his pretended ignorance was a means of keeping out of needless work. A short while later he brought a teakettle of water the exact temperature for my developing trays.

In the dim glow of the tiny red-filtered oil lamp in my crude darkroom, I watched highlights slowly form on the negatives I swished anxiously in the solution. When they came up to their full potential, I relaxed with a pleased sigh.

While hanging them for drying I realized Sam Wong was singing a peculiar song that built in intensity. Now and then a word caught my attention. I listened closer.

"Mee-toll!" his thin, strained voice sang out. "Hy-dee-ka-known. Fix -ee bath!"

Well, naturally. Before me in the film developer tray were two important chemicals, metol and hydroquinone. Close by was the hypo fixing bath. I unhooked the flap that served as a door and stepped out.

"Hey, Sam!" I grinned. "Now whadda you know about 'fix-ee bath'?"

His face lit up in an explosive way. "Me photographer, too!" he cried, slapping his chest.

Over a cup of fragrant ginger tea, Sam and I became fast friends. We discussed the merits of becoming a professional photographer against remaining a darn good cook. He told me about the I-A Kodak he was using.

"Did you bring it?" I asked.

He shook his head.

"You're pretty smart," I nodded. "You probably knew it would freeze in this climate."

Again he shook his head. "No pictures here." He made an encompassing sweep with his hand. "All snow!"

I thought wryly: If only I could have persuaded James Oliver Curwood of this fact.

I had reason to remember the irony of this fact a few days later. While the cast and crew dug in and gave their all, trying to make a picture under extreme conditions, I was frantically checking filter against filter to subdue that wall of white confronting every scene. James Oliver Curwood and his wife headed back to Edmonton and the States; they decided conditions were a little more rugged than they had anticipated. In other words, they couldn't take it.

"What th' hell did they have to complain about?" someone protested loudly. "At least they had a cabin with heat in it."

Nell's tensely collected manner did little to conceal she was inwardly furious. We were now stuck in the location of the author's choosing, with nothing to be done about it. She turned to Ronald Byram, the leading man. "Ronnie, you take their cabin. It'll be some time before we get to your scenes. You might as well be comfortable."

We threw ourselves into work. We *had* to make the necessary shots we'd come all this way to do!



A dog team played an integral part of our story. Though it is commonly believed only huskies or malamutes are used in dog teams, often other breeds (those able to survive the cold) are part of a team. Our story concerned one such dog.

Trainer Peter Graff had supplied us with two identical-appearing dogs; one being the stand-in for the other. The stand-in behaved gently, while his counterpart reacted viciously. And his snarling was not a cued act prompted by the trainer; the dog was so savage he had to be muzzled when not in scenes.

In the story plot, the villainous driver of the team (played by Wellington Playter) resorts to whipping the fang-baring dog to bring him into line. At a point in this brutal confrontation, Nell rushes in and throws her arms about the dog, protecting him from the beating. Later in the story the dog befriends her at a crucial time.

(What the camera doesn't show is that before she rushes into the scene, there's a fast cut and the grossly mean dog is replaced by the gentle dog.)

Our two cameras were lined up, waiting for this important shot. The principals were still in a huddle with the director; one of those interminable delays that take place on any set, even in the sub-temperature of the frozen north.

A swarthy half-breed driver who doubled for Playter, waited alongside the dog team (which in turn, waited for the mean dog to be led in). I'd already formed a dislike for this surly driver; I decided he represented the self-same villain in our story. I saw him move to the head of his team now and kneel beside the lead dog.

I watched curiously as he lit a candle. A second later I gasped. He lifted the dog's front paw and held the lighted candle directly under it.

In Back to God's Country, filmed in 1919, Nell Shipman and one of the dog teams.



"Stop that!" I cried. "What are you doing?" Though handicapped by layers of thick fur, I plunged toward him with flailing arms. The man was larger than I, but I made a lunge for him just as Charlie Burkhart grabbed me.

"It's okay, Joel!" Charlie exclaimed. "He's not hurting the dog." He pulled me back, quieting and shushing me.

Charlie explained that a sled dog's paws were unusually tough, but it was necessary for the driver to singe the fast-growing hair between the pads, so ice crystals wouldn't collect.

I accepted the explanation, but before returning to my camera, I glared once more at the driver. I'm sure he didn't know what the commotion was about; he spoke only through an interpreter.

We were ready to film. The trainer led the muzzled dog into position.

We started the scene. Playter began his beating attempt and the dog responded ferociously to this aggressive action. It became frightening to watch.

We were about to cut the cameras and make the switch to the gentler dog, when Nell cried out suddenly, "Keep the cameras going, boys! Do you hear? No matter what happens – *don't cut!*"

Not knowing what to expect, Dal and I kept at our steady cranking. What we saw all but threw us off tempo.

Nell rushed into the scene, protesting the driver's brutality, then threw her arms around the ferocious dog. We stared horrified; no one dared speak. Even the trainer stood motionless, afraid to intercede. With the dog's face close to hers, Nell's lips moved as though murmuring friendly and comforting words. The dog looked her in the eye. Then slowly he lowered his head, allowing her to stroke him.

Tense moments passed. Several feet of film rolled through the cameras on this shot before Bert Van Tuyle said quietly:

"We've got it. Cut!"

I glanced at easy-going Dal Clawson who seemed unruffled.

"Hold it!" he called. "I want to move in for a close shot."

"No, Dal!" I exclaimed. "Don't take a chance."

"Aw," he scoffed, "this dog's not fierce. He's trained to act that way." He wrapped an arm about his camera and lifted it. "You saw him now, didn't you? Gentle as a puppy. Who they kiddin'?"

Dal planted the tripod a few feet from Nell and the dog. In a snarling flash, the furious dog lunged, sinking his teeth into a tripod leg, splintering the hard wood.

The trainer acted immediately; he brought the dog under control and re-muzzled him. He spoke solemnly to Nell:

"My dog, he is mean. Nobody pets him ever. Nobody."

"I had the feeling he wouldn't hurt me," Nell answered with appealing gestures, "that he'd understand. I – can't explain it."

The trainer shook his head. "He is mean," he reiterated as he led the muzzled dog away.

Van Tuyle called a halt to the day's shooting – a signal the crew liked best. They wasted no time dispersing. Clawson tied and covered his camera in fast time and left. I remained to double check everything before leaving both cameras for the night. Now Bert and Nell were the only two left. They were arguing.

"What a damned fool thing to do!" he bellowed at her. "You took a horrible chance! Do you realize what could have happened?" He waved his arms in angry thrusts.

I watched across the rim of my camera, wondering how Nell would take this man's show of temper. It was the first time he'd displayed anger on the picture.

"I've already told you –" she cried with equal intensity, "I knew I'd be all right. I just *knew!* But don't ask me *how* I knew!"

"Your face!" he shouted, grabbing her shoulders roughly. "It could have been disfigured! Your *beautiful* face." He shook her again and again.

Then he stopped abruptly. Anger drained from his expression. In the electrifying moments that followed, they stared at each other in stunned awareness. I busied myself with the camera. When I glanced at them again, Bert had wrapped her in his arms.

Directors strive to create this moment on film when two people know they are right for each other, but capturing this elusive "something" that happens all too rarely, is not easy. As an audience of one in that setting of bitter cold where survival is foremost, I was gripped by their sudden love.

Bert and Nell. Of course! It was bound to happen.

I puttered with the camera. I wanted to appear oblivious to them. And without looking back, I headed for the cookhouse with its chimney of spiraling smoke and the savory smells of supper cooking.

Work went surprisingly well in the days to come. The romance between Bert and Nell was apparently unbeknownst to others in the cast and crew. Both were discreet, carefully concealing their feelings. Yet, I caught their meaningful glances exchanged in unguarded moments. I felt privileged to be in on their little intrigue and their secret was safe with me. These were not the days of open permissiveness and a scandal would not be tolerated. After all, Nell was a married woman with much at stake; and Ernest Shipman was a man not to be taken lightly.

Dave Hartford had turned more and more of the directing over to Bert Van Tuyle. Like Curwood, Hartford didn't relish the cold and thought up means of staying out of it.

Nell turned to re-writing much of the script – and doing a good job. Just one more facet of this outstanding woman. The script called for a ship stranded and frozen in the ice. With the help of local Indians, a crude but fairly-believable facsimile of a ship was constructed of compo wallboard. Details weren't important because most of the scenes were in long shot.

With Nell's energetic re-writing, however, a new sequence called for us to move in closer. At this range our make-believe ship would never do! For one thing, no hardware dressed it up; no door knobs, latches, hinges. And to compound matters – *no* handy hardware store just around the corner.

Undaunted, Bert Van Tuyle met the challenge. I had come to admire his resourceful way of getting us out of pesky little jams that hold up production. Included in our equipment were abundant long bars of raw Castile soap. Apparently whoever packed them had the practical notion we'd need plenty of soap to keep clean. They didn't know, of course, there'd be no way to take a bath – *nor* the inclination, for that matter.

Bert set about carving the soap, shaping it ingeniously into the needed hardware. As he finished each item, it was dipped in water and thrust in place on the ship, the pieces stuck and froze solid. They were then touched up with a dab of paint and our ship took on amazing character.

One day Ronald Byram came out of his warmly-snug cabin to watch us.

"Hey, y'guys," he called to us in a slurred voice, obviously still sampling the 'medicine,' "when y'gonna get around t'shooting my scenes?"

We stared at him; he was practically in shirt sleeves.

Van Tuyle yelled, "Ronnie, get back to your cabin! Are you crazy! You can't come out here dressed like that!"

"Aw! You're a bunch of sissies!" Ronnie scoffed. "Why it's invigorating. Jus' get a whiff

of that air. S'nothing like it!" He thrust out his chest, gave it a vigorous beating with his fists, and inhaled deeply.

"Stop!" Nell screamed. "For God's sake, Ronnie!"

"Ok, Ok," he grumbled and sauntered back to the cabin.

Mindful of Charlie Burkhart's admonition about taking deep breaths, we exchanged startled apprehensive glances.

With a night scene coming up to film, most of us dreaded it. I tried to talk Nell and Bert out of making it, but they insisted the sequence was essential. Wellington Playter refused outright to work in the grim sub-temperature of an Arctic night. Therefore the action had to be changed to a medium shot and we'd use the half breed driver for a double.

"Nothing to it! We can get it in one take," Van Tuyle assured me in his confident way. "All I want is a quick shot of the dogsled as it swings toward us then heads out across the lake. We've got plenty of magnesium flares to light it."

I couldn't talk him out of it, so I dismissed my reservation about working in a probable sixty-below. After all, we'd made good headway lately; things had been going unusually well.

But not for long . . .

We hired Indians to hold the magnesium flares aloft. When we lit the flares they made a loud hissing sound which immediately scared the Indians. Into the snowbanks went the fiercely sputtering flares as the scrambling Indians disappeared. We peered after them in the ominous darkness, knowing that no amount of enticing would bring them back.

Scrounging for fresh help was out of the question. I decided the driver of the dog team would carry a flaming torch, and I'd make out with only one flare. The task of holding that one flare was relegated to a very reluctant assistant director.

I called for a rehearsal. While Charlie Burkhart briefed the half-breed driver (the only one among us who spoke his language) I ducked into the cookhouse where Bert was going over the script with Nell. He'd already told me what he wanted in the scene and left me on my own to shoot it; no point in us both being cold, he'd decided.

Charlie busted in a few moments later.

"I could kill him if it'd do any good!" he barked with an angry scowl.

"What happened?" Bert asked.

The husky outdoorsman swore under his breath. "Aw, that half-breed won't do it! Ran off like the others."

"What?" we echoed together.

"Says you're a bunch o' crazy people, workin' in the cold of night. They got some kind of superstition. Or else, they're a lost smarter than we are."

We glanced at each other anxiously.

Van Tuyle was quick with a solu-



*In later years, shooting **The Grubstake**, Nell Shipman clings to the cliff, Clif Maupin holds a reflector, the author mans the first camera, Bobby Newhard cranks the second camera and Bert Van Tuyle directs from a ladder.*

tion. "Look, I'm about the same size as Player. And in a medium shot, at night, wearing a parka - no one will know the difference." He rose to his feet. "I'll go to my shack and get the fur riggings and meet you out there."

At a distance Bert Van Tuyle was a perfect double for Wellington Player. What amazed us though was how Bert drove the dog team with such authority, steering them by commands, holding the sled on course, and all the while waving a burning torch like a veteran of the north.

We shot the scene with no difficulty. Later, when we returned to the cookhouse, I asked him if he had ever driven a dog team before.

"Heck, no!" he answered, pleased with himself as he tugged at heavy overshoes of thick rubber. "But I got eyes and ears. I've seen 'em do it. 'Sides," he gave me a sly wink, "I'm a ham actor at heart!" He continued struggling with the heavy boots. After a few moments, he asked quietly, "Joe, will you help me with these things? My feet feel kinda strange. In fact, they don't seem to have any feeling."

I removed the bulky overshoes. Thick felt socks were supposed to be underneath; instead he was wearing regular leather shoes reserved for indoors; we'd been explicitly told they'd freeze if worn outdoors in this climate.

Charlie gasped, "My God, Bert!"

I unlaced the shoes hurriedly. His feet were bloodless with an unnatural tinge of gray.

"I was hurryin' - " Bert sputtered nervously, his face flushed, "guess I plain forgot about the damn shoes!" He gestured. "Get some snow. Rub on 'em. That's what you're supposed to do."

"No!" Charlie cried. "You're to soak your feet in water." He motioned to Sam Wong. "Bring a tub of water, just barely warm. And Bert - " he drew in his breath sharply, "you might as well know that

when your feet start thawing, they're gonna hurt like hell. But it's all we can do 'til we get you to a hospital."

"Hospital?" Van Tuyle glared at him. "Whadda y' talking about? Are you crazy!"

"Just a precaution, Bert."

"Well, I'm not going to any hospital! There's nothing wrong with my feet. So they got a little cold. I'll warm 'em up. Hurry up, Sam, with that water! What's keepin' you?"

"Hush, Bert," Nell murmured. "You must listen to what he tells you."

She knelt before him as Sam brought the tub of water, and gently stroked his numbed feet in the tepid water. Lifting pleading eyes to him, she whispered, "Dear, you can't take a chance. Please listen to Charlie. He knows about these things." Her soothing influence relaxed him considerably.

I pulled Charlie Burkhart to one side. "How serious is it?" I asked.

A grim tightness was about Charlie's mouth. "Gangrene could set in. It may even mean amputating. The sooner we get him to a hospital, the better."

My thoughts raced; Van Tuyle would be difficult. Already the pain that had been predicted was obviously setting in, though Bert's taut grimace indicated he wouldn't admit it. "Getting him to a hospital won't be easy," I said to Charlie in a low voice. "He's a stubborn Dutchman and once he makes up his mind - "

At that moment Dave Hartford burst into the room. Yanking back his parka, he babbled, "Something's wrong with Ronnie!"

"Who?" we yelled in unison.

"Ronnie Byram! I think it's pneumonia. He has terrible fever. I thought at first he was drunk. But no! It's like some kind of coma."

"Oh, my God!" Nell screamed, "It's because of what he did that day – breathing deep down in his lungs!" Her desperate eyes were enormous and brimmed with sudden tears as she darted a helpless look to the men about her.

Silence in the room was unbearable.

"It'll be an hour or so 'fore we can get him out," Charlie Burkhardt calmly calculated. "I'll need some help. Word must get through to hold the train." He issued orders to those about him, then gestured to include Van Tuyle. "You, Bert, come with me to Edmonton. I'll need you. And while you're there, they can take a look at your feet. Ok, everybody – no we haven't much time."

A week of pale-sunlit days and unendurable long black nights had passed since that chilling sight of Charlie Burkhardt racing into the darkness behind a pack of frenzied yapping dogs and a tightly roped sled carrying two men deeply bundled in fur.

Not a word had we heard since.

Our anxious gazes turned often to that same horizon – but the wide span of gray and white remained desolate and lonely.

Work continued at an accelerated pace. Dave Hartford resumed directing. His crisp, brusque commands left little doubt the picture was to be finished as soon as possible.

Still many scenes remained to be made; we hadn't touched upon the "love interest" between the girl (Nell) and her leading man (Ronald Byram); those tender episodes that give heart to a picture. Nell had written stirring dialogue to be shown in titles on the screen, an important factor in "silents." But now . . . as we awaited word from Charlie Burkhardt, we dared not think of those beautifully planned scenes.

It was close to two weeks before he returned. Charlie Burkhardt was alone. He looked tired and haggard. We approached him with frightened, questioning eyes. He looked at us solemnly and said with quiet finality:

"Ronald Byram is dead."

The stunned silence that followed was matched only by the incredible silence of that northern setting.

Nell asked in a tremulous whisper, "And Bert? Is . . . Bert all right?"

Charlie looked off into the distance. A puzzled frown drew his brow. "I don't know," he answered simply. "I really don't know."

"What do you mean?" Nell cried, tugging his heavily-mackinawed arm.

"He wouldn't take advice from anyone!" Charlie replied anxiously. He clenched and unclenched his fists, and resorted to an anguished shake of his head. "Joe was right," he shot me a corroborating glance. "The guy's a stubborn Dutchman!"

Nell implored him, "But what happened?"

He motioned toward the cook-house. "I'd sure like some coffee, if y' don't mind. We'll talk about it there."

We followed along with him, dragging ourselves toward the low shack banked deep in recent snowdrifts.

Charlie stirred repeated spoonfuls of sugar in Sam Wong's strongly brewed coffee. Sam brewed coffee like he did tea – dark and bitter, with a pot of hot water on the side. I'd noticed, however, the coffee drinkers in our crowd forewent the pot of hot water; either they'd acquired a taste for Sam's potent drink, or they figured this was what they needed to face this country.

"We got to Edmonton," Charlie began with slow weariness. "They've a pretty fair hospital there. Not the kind you folks are used to, but they'd had plenty of experience treating what was wrong with these fellas. In Ronnie's case –" he paused and sucked in his breath, "don't suppose anything could have saved him. The tips of his lungs were frozen. But those doctors sure tried; I'll say that for them."

He took a swallow of coffee from the heavy granite-wear cup and savored it a moment. "In Bert's case, they made the mistake of telling him if his feet didn't respond to treatment, they'd have to amputate in slow degrees. From that moment on, I couldn't get that guy back to the hospital."

"You mean nothing was done for him?" Hartford asked.

"Not in Edmonton, there wasn't. He jus' stayed in the hotel room, drinkin' Canadian rye. If he wouldn't come to reason, I decided gettin' drunk was his best way to stand that kinda pain. When I tried to plead with him, he'd shake his fist and say, 'No quack in the boondocks is cuttin' off *my* feet!' He meant it, too."

"Poor Bert . . ." Nell murmured.

Charlie finished his coffee and pushed the cup aside. "But when Ronnie died it shook Bert up pretty much. Sobered him all right. I was able to convince him he should go to the hospital in Calgary. 'Fore he left he had to brief me on details about Ronnie, where to send the body – and my gawd, the red tape y'have to go through when somebody dies outside his country!"

"One of us could have come and helped," Nell offered, "if you'd only sent word."

"There wasn't time. My real worry was getting Bert off to Calgary. I had the idea he was a little delirious. He kept drumming at me how he'd be walkin' fit as a fiddle and be right there to meet you guys when y' pull into Calgary. And by God! he knew every scene you had left, how blasted long they'd take; and the day, hour, practically the minute you'd be arriving in Calgary on your way back to the States!"

"Did you go with him to Calgary?" someone asked.

"I couldn't get away. But when I put him on the train I gave him some stern talkin'. 'Bert, you've got some real trouble here,' I told him. 'It's not jus' your feet, it could mean your very life. There's some sharp doctors in Calgary and if they say you might have to have some amputating, you've got to face up to it.'"

"The hell I do!" was what he answered. And as the train pulled out, he yelled back at me, "If that's the best they can tell me – I'm headin' for San Francisco!"

Nell gasped. "Headed for San Francisco? Did you find out what happened?"

"Like I said, I had all these formalities about Ronnie to take care of – people in authority can be awfully exasperating. By the time I got finished, it was too late to go to Calgary."

"Too late?" she cried. "What do you mean?"

"I'd already gotten the word. Bert was no longer in Calgary. Apparently they gave him the same story as he got in Edmonton. He was on his way to San Francisco."

Nell clamped tight fingers across her eyes pressing back tears. After a few moments, she asked in a choked voice, "Has anyone had word about him?"

"No, ma'am. That's the last anybody's heard of him."

Our energies were now directed to finishing the remaining work and getting out. We set a departure date and meeting it seemed a herculean task.

But that day finally came. Our mounds of equipment were packed on a string of dog sleds and we were ready to shove off.

Along with me in the sled were the treasured cans of exposed film. White adhesive tape, stuck across the face of each metal can, proclaimed pertinent data of its contents. Also written in bold letters was the film's title: *Back to God's Country*.

How well I realized these containers were the only tangible evidence of our long weeks of grueling effort. Carefully I checked that all were securely tied in the sled; it was the umpteenth time I'd done so.

While waiting to take off, I turned and gave a last look at the vast setting that had dealt us serious blows. How serenely innocent it looked in the morning light. That pristine white. That great silent calm stretching unperturbed. How soon we had learned of its overpowering strength, its still-voiced irrefutable message: "Obey my laws."

God's country?

I breathed an appreciative sigh.

The sleds started their swift gliding and I buried my face in the fur of a shielding parka against the wind.

The Edmonton, Dunvegan and Pacific train, jerking along on its narrow roadbed, hadn't seemed this dingy, stale-smelling, nor depressingly dreary on our trip up.

But for that matter, glancing about at our bedraggled group, neither had we. It was difficult to realize we were the excited people who gave way to easy laughter in this same little train a short time before. Bone-tired and hollow-eyed, we now sat glumly silent.

Nell's stare was fixed tensely on the endless miles of bleak frozen tundra edging past the murky-streaked windows. Now and then she'd heave a brisk sigh as though resenting the slow-moving pace.

Though depleted with exhaustion, I allowed myself to lapse into horrendous doubts about the scenes I'd photographed. I rehashed the same questions I'd been over and over:

... How much static electricity, do you suppose, had been generated in that intense cold?

An avalanche? Negatives literally peppered with flicks of light? But I'd *taken* every precaution! Even so – it could happen ... Supposing the temperature had caused the film to shrink? Now the perforations could be damaged! But no way of knowing until the film's developed – then it's too late! The film would be ripped to pieces in the printing process.

If *only* I'd had access to a lab. Now I wasn't sure if I had anything at all!

I threw off the heavy mackinaw burdening me and passed a hand across the back of my neck. At this point I wasn't sure I wanted to be a cameraman. The weight of responsibility that rests on that man behind the camera hit me squarely. After the expense and incredible hardships, it all came down to one important factor – the only thing to show for it was that little strip of film! It'd better be right.

I leaned back on the hard-cushioned seat in an effort to steady my nerves. I listened to the steady clicking of the wheels.

How many miles to civilization? How many miles to Hollywood? How many miles to a lab?

We hurried through Edmonton, taking time only to get rid of our grime and change to regular clothing. Then we headed to Calgary with no intention of dallying there either. If our schedule were correct, we'd just have time to make a fast connection out of there to San Francisco.

Eight gaunt-looking men, all that remained in our troupe, and one handsome, courageous woman, entered the railway station at Calgary. We dropped our hand luggage in a heap and flopped on the closest bench to wait the short interval between trains. Suddenly we heard Nell cry out. We followed her incredulous gaze.

Across the waiting room, limping toward us with difficulty, but grinning his broadest – came Bert Van Tuyle. He called proudly:

"I told Charlie Burkhart I'd be right here to meet you when you headed back. Everywhere I went, they wanted to cut off my feet, but I'd be damned if I'd let them!"

Nell rushed to his outstretched arms. He wrapped her in a tight embrace; there was no hiding their feelings now. He kissed her as she clung to him.

I smiled happily and glanced at the men about me. Had this romance come as a surprise to them? Whether it had or not, the immediate acceptance in their eyes made it obvious they were men of understanding and they'd remain tightlipped and loyal to Nell. Besides, weren't we all just a little bit in love with her ourselves?



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Vamping

Harry (Patrick Duffy) discovers incriminating evidence while burglarizing Diane's home. Most of the sequence was photographed handheld by Skip Roesel (left).



The opening images are black and white. An odd dreamlike haze follows the viewer through a dark doorway. A saxophone, untouched and covered with cobwebs and dust, rests in its case. A soft breeze begins to blow past the unused instrument. Blank sheets of music begin to drift past the saxophone. One sheet in particular moves lazily along the ground to rest near a small pool of water. A woman's shape is reflected on the

water's surface. Voices can be heard faintly in the background repeating again and again, "Play the song, Harry." But there is no music, only unconnected sounds. Suddenly, as if by magic, a line of music appears on the once blank sheet of paper near the woman. But before the notes floating abstractly about can form into a conscious melody, the dream ends and Harry Baranski must face the

harsh, sometimes cold reality of another day.

With this striking and mysterious black and white dream sequence, director Frederick King Keller captures his audience and holds its interest through to the final unexpected twist of his most recent film *Vamping*.

Filmed against the dark and dilapidated backstreets of Buffalo, New York, *Vamping* is the story of jazz musician Harry Baranski. Lacking musical inspiration and down on his luck, Harry, (Patrick Duffy) is reduced to having to hock his saxophone to make ends meet.

Unable to get the money needed to buy back his instrument, Harry agrees to do some small time stealing for an individual known only as the "Fat Man" in exchange for his saxophone. Harry agrees to steal some stained glass from the home of a record executive who has just died. But what Harry finds inside the house is more than he bargained for. While rummaging through the bedroom, Harry not only finds himself completely captivated by a picture of the deceased's wife, but also by a ring of tremendous value. A ring that some people, Harry unwittingly learns, will go to any lengths to get back.

Shortly after the completion of a second draft of the screenplay for *Vamping*, Keller received word that actor Patrick Duffy was interested in playing the role of Harry Baranski. The bad news? Because of Patrick's role as Bobby Ewing on *Dallas*, he could only be in the film if it were shot during his hiatus, which meant that Fred had only five weeks to put everything together before shooting would have to begin, and even worse, in a period of 30 days everything from casting locations to another rewrite would have to be completed if things were to go ahead on time.

Experimentation takes time, and the particular kind of experimentation that Fred was interested in trying could easily involve

months of pre-production. Fortunately, cinematographer Skip Roessel had been privy to discussions concerning the film's style. He had also read the script. "This, of course, was the great thing," remembers Fred, "because Skip and I had made several films before and I know very well how he works and he knows how I work. That was one of the saving graces of the piece."

Because of the importance and complexity of the score, Fred was seriously considering a top name composer, but, because of the budget, that was quickly ruled out. At this point Fred's father, an actor and the character known as the "Fat Man" in the film, suggested they look at a local composer, Kenneth Kaufman. Kenneth's major work to date had been for commercials which made Fred a bit apprehensive until their first meeting. "I was completely in sync with his ideas," Fred recalls. "He was brilliant and yearning for a chance to do something longer."

While most of the musical score could be written after the film was shot and cut together, there was one song, a love song, that had to be written and recorded before a particular scene could be filmed.

In the film, Harry, determined to meet the woman he has become obsessed with, writes a love song and claims that her husband, the deceased record executive, had commissioned him to write it for her. In this highly dramatic moment, his deep love for her is expressed through this poignantly haunting melody.

When asked if he was concerned that such a dramatic turning point in the film should be left to a single melody, Fred replies, "I was terrified, until I heard the song."

With time growing short, Keller was under pressure to decide upon a format to shoot *Vamping*. Unable to raise additional funds in the time remaining, Fred decided not to shoot *Vamping* in 35mm. "There are many locations in *Vamping*, recalls Fred,



Catherine Hyland as the mysterious Diane.

"and that's murderous on a budget; it's just too expensive. We could have shot it for half a million dollars on two sets in 35mm, but not in 40 locations."

Super-16 also presented some problems. Because cinematographer Skip Roessel owns his own Arriflex 16-SR and a set of super speed Zeiss primes, they wanted to go with an Arriflex adapted to Super-16 so that they could utilize Skip's lenses. The only Arriflex they could find adapted for Super-16 was tied up somewhere in Europe. If they went with Super-16 now, they would have to rent both a camera and lenses which could cost them as much as \$10,000 more than they had anticipated.

It was about this time that Fred saw a Swiss film entitled *The Boat Is Full* by Markus Imhoof. Fred was amazed when this beautifully photographed film gave credit at the end for blowup. It was after contacting Imhoof, who told Fred that a Swiss lab had blown up his film from regular 16 to 35mm, that Fred decided to shoot *Vamping* in regular 16. By using Skip's equipment and having Probst/Film in Switzerland do the blowup, Fred could save the production money as well as get a superb 35mm blowup. To help in securing the best possible blowup

of *Vamping*, Film House in Toronto, Canada agreed to process all of the original film one centigrade colder than Kodak specification to help "freeze" the grain. Since A and B rolled 16mm film has a tendency to "jump" in the optical printer because the pitch of the black leader is different from the film stock, Probst/Film did an optical 10-frame overlap zero cut to eliminate any "jump." All effects from fades to dissolves were done at the same time the film was being "cut" and printed directly onto a 35mm CRI. This was done to eliminate unnecessary handling of the original negative. The result is an outstanding 35mm blow-up from a 16mm negative.

Since neither Skip nor Fred were familiar with this particular method of blowup, they decided to use only the 7247. Despite the many dark interiors and sparsely lit rooms, they felt they had enough on their hands already without worrying if the 7293 would blow up grainy. This meant more work for Skip, however. Since many large open areas were used in the film, and because the lighting package Skip used only had some 15,000 watts altogether, filling these large areas with light was quite a challenge.



"Fat Man" (Fred A. Keller) flummoxes customers at his antique shop. The obie light on the camera is a 75-watt flood bulb gelled blue.

But as Fred remembers, "He really relishes a challenge and that's what makes it fun for me. The last thing you want from a cameraman is 'I just can't do that.' Skip never says that. He always looks at me puzzled, goes off, and when he comes back he will have figured something out."

Because so many large areas were used to visually emphasize Harry's smallness in the scheme of things, and since Skip was limited as far as artificial light was concerned, Skip decided to overcome this obstacle by using sunlight as his key light source in the day interiors. To balance the needed tungsten lights with the daylight coming through the windows, Skip would use a full blue or a half blue filter on the lights. This way "we could blend that with the light coming through the windows," says Skip, "and get large washes of blue in all the daylight interiors." As Skip recalls, "We were just trying to get the inside light as blue as possible."

"I always feel that light has some color," says Skip concerning his approach to lighting. And because so many of the interiors were shot with existing daylight, Skip is quick to point out that "it's essentially skylight, so it should be blue. I like to stay away from white light as much as possible. Even when you're filling an exterior with a reflector board, the reflected light that you're building up is actually skylight and that's not white, it's blue. So when I fill an exterior with a foam core, I like

to put a little blue gel on it so that it feels colder."

For many of the day interiors, Skip would usually half correct the tungsten lights with a 202 or booster blue "and then," as Skip recalls, "I wouldn't use an 85 on the camera at all." When a filter was required, Skip on occasion would use a coral filter, "which is like a third of an 85." Because daylight has color, "you want a slightly blue negative in a situation like that, because if something is neutral grey in that scene you don't want it to read neutral grey, you want it to read a kind of slate grey or blue grey because it's being lit by skylight and it should look a little cold."

One of the problems with soft skylight is that it makes it hard to get modeling on the actor's faces. To create modeling, Skip would shoot towards the windows or the light sources whenever possible or across the light sources to get a side light or soft backlight. If a master shot was required for a scene, Skip would try to position the camera as far away from the window as possible. This way he could shoot almost directly towards the windows or across the windows so that even though soft skylight was the key source, the actors would have good light modeling.

On those occasions when Skip needed to draw someone away from the background, he would use an inky gelled blue. This small rim light would be enough to separate them from the background and was only used when nothing else worked, because Skip did not like using hard lights in the day interiors. "In most of these locations," recalls Skip, "there was not a whole lot of artificial lighting going on."

The colorful nature and deviant elegance of the Fat Man, demanded that he constantly be surrounded by colored lights. With a single source light, such as a lamp or a candle, the colors conveyed the delightful decadence of this rotund rogue. To light the colored intimacy of his office the first

time Harry comes to visit, Skip took the lamps being used as props and simply accentuated their colors. On the desk was a green opal glass lamp. By putting a matching gel over an inky, Skip was able to make that his key source. Other lamps in the room had ruby or amber colored shades and were made brighter by this same method to give the Fat Man's place as Skip says, "a warm, small lamp kind of feeling."

Since the color and shadow make up such a large part of *Vamping*, certain colors were decided upon to be used in those places where colors would be needed. This was done to maintain a thematic consistency, and the colors used – magenta, cyan (a warm blue), and golden amber – were all picked because they helped to add a dark kind of warmth to the visuals and locations.

One location where this colored light was used was in a singles bar in which Diane seeks refuge to escape Harry, who has been following her all afternoon. Instead of using hanging lamps to light the entire bar and some 200 extras, Skip decided to backlight everyone with strong magenta and amber gelled light sources. A 1K with an amber gel was placed in the back corner of the bar. Another 1K with an amber gel was positioned against the same side of the room but 90° from the other light "so that you have two color keys," says Skip, "sort of wrapping people." To light the bar, photofloods and inkys were used. Everyone except Diane is set against this hard colored light.

When it came to lighting Diane, the *femme fatale* of the story, it was all too obvious that she should exude romantic beauty, and so a soft diffused look was used. To separate her from the bright colored lights of the bar, Skip put a photoflood in the fixture over the table where she was sitting and used tracing paper to soften the light. A dimmer was also connected to the light for more control. An added fill light

was bounced onto her face so that if she leaned too far under the overhead light it would not make her eyes go dark and hollow. Filters were also used to add romantic softness to Diane's features. Skip uses a #1/2 or #1 Harrison diffusion filter because he likes the way Harrison filters create a kind of "glow" to the image. Surrounded by the brash light of the bar, Diane sits almost shielded in the soft whiteness of the booth - Harry's vision of romantic beauty.

Harry, however, is neither colorfully nor glamorously lit. His lighting is sometimes as harsh and cold as his very existence. The one exception to this is when he plays. When he picks up his saxophone and performs the love song to Diane, Harry becomes as bright and warm as the star he is.

To make this moment in the film as dramatic and personal as it was, many elements were needed. Combinations of light and color were used to convey the powerful feelings evoked. Harry's key light was a white light coming from the kitchen. With Harry's face well defined, a 1K with a magenta gel and a 1K with an amber gel were placed above him pointing down. As he begins to play the romantic ballad, fog starts to fill the room. Using a western dolly, the camera begins to slowly circle around Harry as he plays. "I wanted to simply draw the audience in closer to the music," says Fred concerning his approach to this scene. "This was not a time to do anything terribly fancy with the camera."

As the camera arcs slowly around Harry, one colored light disappears behind his head leaving only a rim of color just as another light emerges sun-like from the other side. The musicians behind him are but silhouettes through the colored, foggy light. It is as if, for that moment, Harry is the brightest star in the universe. The idea, remembers Skip, "was to isolate him in that little world of his own performance."

Diane, on the other hand,

is sitting in a darkened alcove lit only by candles. To light Diane, Skip used a lighting source that he had developed during the course of shooting *Eyes of the Amaryllis*. Because so much candlelight was required for that haunting period piece, Skip combined his lighting inventiveness with basic household lighting equipment to come up with a way of creating a soft candle look without having to use more than a few candles. Taking several household porcelain sockets. Skip connected them to a household dimmer. Using 150 or 75 watts reflector floods, Skip would dim the lights down to the color temperature of the candle. With the lights dimmed, they created a large soft area of light that looked identical to candlelight without the flicker that so often accompanies candles. By putting one of these lights on a gobo arm positioned just below the candle and directed towards the actor's face, it was easy to follow someone moving around a room. Because candles require a lot of light points, this method was effective and inexpensive.

If a Lowel kit, the kind which utilizes EAL photofloods, is being used as lighting equipment, all that is needed is the dimmer

and the reflector floods to create this candlelight look.

For the specific lighting of Diane in the club, Skip had to position the light below her eye level since the candlelight on the table was the only source of light. Again, diffusion was used to soften and extend the light.

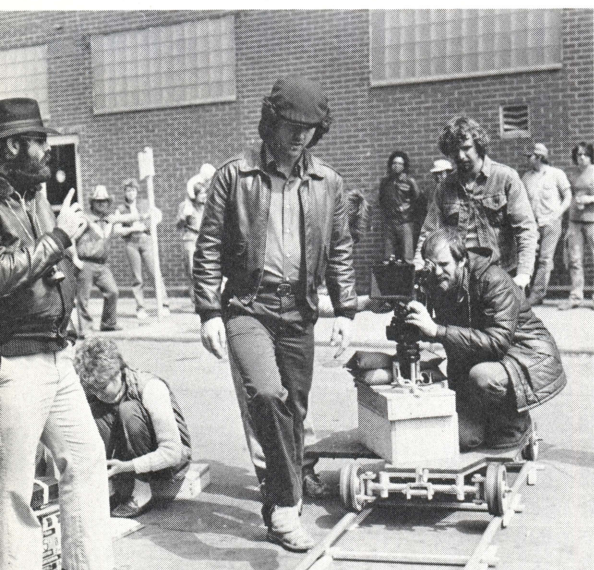
As Diane listens to the song Harry has written for her, the camera dollies slowly towards her making it seem as though nothing else exists in the world except her, Harry, and the song.

Aside from the lighting and the staging, the song is an important element, giving this scene its dramatic power. An incident which shows the song's captivating allure took place one day as Patrick Duffy was rehearsing to a playback of the song. As the music began to play, the film's extras suddenly stopped what they were doing and began coming into the bar to find out where the music was coming from. "It was almost as if Patrick were actually playing," Keller recalls. "It was very eerie. And at the end of the tape, they (the extras) just broke into spontaneous applause. It was such a wonderful performance."

Because the main character is a musician, the musical score

Duffy is coached on the set by saxophonist Bobby Militello.





Making a dolly shot on a street in Buffalo. Director Fred Keller (left) coaches Duffy while Roessel and key grip Tom Trovato line up the move.

was as important as the story itself. Right from the beginning it seemed obvious that the music should convey Harry's emotions, like a narrative voice telling us what Harry is feeling and what he is thinking. "I don't think there was ever any question about that," says composer Kenneth Kaufman. "It seemed to me that this was going to be an obvious notion, that the music was going to have to be what was going on in his mind."

As Harry finishes the dream-like melody he has written, tears run down his cheeks. This is the closest we will ever come to really knowing this tragic, ill-fated character. He looks over to the booth where Diane is seated only to find that she has left. Despite the strong, heart-felt applause, the likes of which Harry has not heard since his days in Paris, he goes after her. Outside the bar where Harry finds her, she explains that the song was a painful reminder of her husband's death. "I don't want to be alone tonight," she says to Harry and they leave for his apartment.

Usually with a thriller the music is used to "cue" or tell the audience what is about to happen – a device for building and maintaining suspense. In *Vamping*, however, that concept was drastically changed. "Do you notice,"

says Kenneth commenting on most film music, "how the music will lead you up to a point of suspense even though nothing on the screen has told you that anything suspenseful is actually happening? The music is cuing you. I didn't do that in this film because it is all in Harry's mind. In other words, if something bad was about to take place, I waited for Harry's reaction as opposed to building up the audience's suspense."

And indeed bad things do happen to Harry. Thinking he has been found out by the police for his petty crimes, Harry tries to run, but it is only after a gun is fired at him that the music starts. Music conveys the extreme anxiety of being hunted, "literally using the saxophone to create screaming and anguish," recalls Kenneth. The same thing was true when Harry first sees Diane's picture. "I wouldn't necessarily presume," says Kenneth, "that those of us in the audience fell in love with her at that point. But the point is that he did. So I wanted to get across the instant clicking inside his head that was leading him, drawing him to this woman." And Harry is drawn to her. The woman whose reflection covers the small pool of water in the initial dream scene finally turns to us. As she slowly lowers a rose onto the page now filled with musical notes, the image suddenly shifts from black and white to color signifying that the dream has become life.

To create this magical shift from black and white to color, the shot of her setting the rose onto the music was painstakingly filmed in both color and black and white. By finding a shot in color that matched with the one in black and white, it was possible to cut them directly together to create a beautifully haunting image without the enormous cost of a special effect.

Because some 20 percent of the film takes place in Harry's apartment, it was decided to build that room onto a set. To create the long, sharp shadows for this particular scene, Roessel had to

overcome a few obstacles. Since Harry's room in the film was several stories up, the street light outside was actually below the window level. Had it actually been a room with a street light outside, Skip could easily have used that light as the source because to get a sharp, well-defined shadow, "you need a powerful light and a small point source," says Skip. "The smaller the point, the better the shadow definition you get through the blinds." Had the set been built in a large studio or warehouse, he could have re-created that street light look by placing a large lamp such as a 5K 30 or 40 feet away. "Then by the time it gets to the edge of the set," says Skip, "it's running pretty parallel and will cast nice sharp shadows." But the back of the set was only eight feet away, so Skip had to find a small point source without the added advantage distance brings. What Roessel did was take two Fresnels, a 1K and a 2K, placed them on the floor outside the set window, and remove the glass from in front of the lights. "When you pop the lenses off these Fresnel lights," recalls Skip, "what you see is just the bare bulbs burning in there and it's a small enough point source that you can still get sharp shadows through the venetian blinds even though those instruments weren't that far away from the venetian blinds."

The 1K was directed through 1/3 of the bay window in the room and the 2K was directed through the rest. "Since Diane and Harry were both sitting together on the floor on the same level," says Skip, "and the eye lines matched and the light lines matched; we aimed them so that they'd play as one source."

Since the bedroom was a set, Skip utilized a Coop light for some of the lighting. Made of foam core, the square enclosure contains two EAL bulbs. A skirt of black material was attached to the sides to keep light off the walls. By hanging the Coop light from the ceiling it gave a soft top light that created good separation

and cut down on the need for a lot of other lights on the set.

When shooting 16mm for a 35mm blowup, sharpness is always a major concern, so diffusion was not used except when shooting Diane and the dream sequences. Prime lenses were used almost exclusively. The one exception to this was an Angenieux 16-44mm, 1.4 zoom lens used on occasion as a variable prime because of its sharp focus. Even minor things such as avoiding too many long shots were closely watched in an attempt to get the sharpest blowup. During the filming of *Eyes of the Amoryllis*, Skip had encountered problems with focus. "When you're using a zoom lens," remembers Skip concerning his last shoot, "you have a large scale on the barrel and you can see the markings, but the lens barrels of the high speed primes for the Arri cameras are so small and the markings on the scales are so close together that it's very tough to do convincing follow focus with 16mm."

To avoid these focus problems during *Vamping*, especially with all of the intricate focusing involved, Skip used a follow focus system. Attached to the lens, the large markings allowed the focus puller to execute the trickiest of focus maneuvers with lenses as small as 9mm.

Besides overexposing to get the best possible negative, additional sharpness was achieved by using rim or edge lighting whenever possible. Skip believes that "the edge lighting tended to help us create an illusion of sharpness even more than what was actually there."

Both Fred and Skip believe that 16mm is a viable format for feature length films. With labs like Probst/Film in Switzerland and DuArt in New York blowing up to 35mm, in many instances a savings of time and money during shooting can be realized. "If you handle 16mm the way you do 35mm, in terms of the care you use in laying the shots out and lighting it and especially setting

the focus up," Roessel says, "I think that 16mm is perfectly acceptable. It allows pictures to be made that couldn't be made otherwise."

The dreams that Harry has throughout the course of the film are very important to the development not only of Harry's character but also the story. It was decided to have the dreams shot in black and white, so that every time the screen went to black and white, the audience would know that this was one of Harry's dreams. Shot with Plus-X 7231, the fog-shrouded dreams, along with the lighting and the music, serve as another insight into Harry's mind. This makes the image of the woman in his dream setting the rose down onto the music sheet that much more haunting, because as the image shifts from the black and white of the dream to the color that is life, it becomes clear that Harry is living in a dream world - a make-believe reality that will ultimately be his fatal mistake. ■



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Return To OZ

The Lion, Scarecrow, Ozma (Emma Ridley), Jack Pumpkinhead with Billina on his shoulder and Tik Tok form an Oz family portrait.



Photos by Barry Peake, Richard Blanshard and Douglas Dawson

The main ingredients of a fantasy film are a healthy dose of realism and a heaping spoonful of magic. *Return to Oz*, a Walt Disney Films release, has the requisite amounts of this contrary mix. Director Walter Murch has been to Oz, just as surely as Victor Fleming had been, and though what he saw in the Emerald City is different from what Mr. Fleming saw, it is still most wonderfully Oz.

The story is based on at least two Frank Baum books, "Ozma of Oz" and "The Land of Oz," and contains an imaginative cast of characters. Dorothy, played by Fairuza Balk, is joined by a group of surprisingly human mechanicals. There is the round-faced, round-bellied Tik Tok, a

clockwork man; Jack Pumpkinhead; Billina, the talking hen; the incredible flying Gump; and the familiar Scarecrow, Tin Woodman and Cowardly Lion. This story contains not only an evil witch but the terrible Nome King, and it is rather hard to tell just what he is — a rock-like human or a human-like rock.

Disney's new Oz depends on a wide variety of special effects to create the realistic world of Dorothy and her friends. Many talented people contributed to the magic of the film. Highlighted here are the creature design supervisor, Lyle Conway; the clay animation supervisor, Will Vinton; and last, but certainly not least, David Watkin, the director of photography on this new journey to Oz.

Conway, the Merlin Olsen of Muppetland, was the organizing force behind the creature shop. Originally from Illinois, he has worked on most of the major fairy tales that have come out in the last six years. He sculpted the alluring Augra and the terrible Skeksis for *Dark Crystal* as well as the lovable head of Miss Piggy for various Henson productions. His trip to Oz was followed by a trip to Wonderland for the film *Dream Lovers* where he helped bring to life the incredible creatures first imagined by Lewis Carroll.

He and his crew designed and manufactured the radio- and cable-controlled creatures and the suits for the creatures which accommodate a human inside. More than a year was spent in pre-

production, building – among other curious things – the perfect animatronic chicken. It may sound silly, but it was no laughing matter.

“Billina was my favorite,” Conway said. “In the beginning I tried to get them to use a chicken. We got what became the house chicken and let me tell you, boy are they stupid! They are probably the most stupid animal I have ever run across. They just won’t do anything.” Obviously, this could be a problem. Especially since Billina had to be able to beak sync.

“When we discovered how dumb chickens were, some people actually talked seriously about a little person in a chicken suit. I suggested our shop do a mock-up of an animatronic chicken head to show how it would work. In the end, there were about five versions of Billina. Some had cables in the head, some were radio-controlled, some had a hand in the neck. The wings were sometimes rods and sometimes radio-controlled, plus we used a real chicken for some shots,” Conway continued.

“Part of the process of designing Billina was arriving at what color she should be. So one day we went down to the casting coop and brought back a half a dozen chickens and Walter picked out one he liked. Then we went out and found feathers to match. What we didn’t realize was chickens change color about halfway through the year. So our chicken wrangler finally got some eggs and raised our chickens from scratch (argh!). Anyway, it turned out that young chickens were darker than the older chickens, so it was a constant battle to get the right age chicken. There was one scene we shot as our chicken was beginning to moult. There is Dorothy, petting the chicken and pulling out great wads of feathers. We had to find a chicken that wasn’t moulting.”

There were some minor problems with the real Billina, but the difficulties with the animated version were greater – even a little

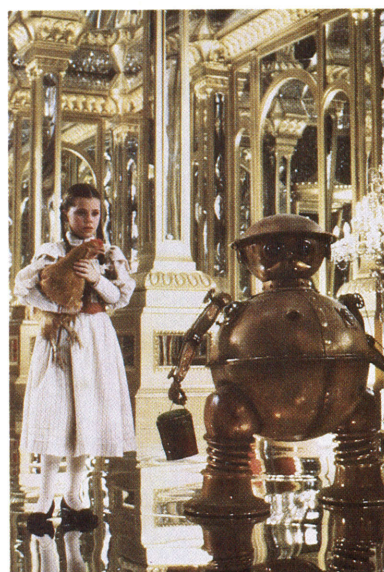
scary – because even a fantasy chicken has to move like a real one. “She did scare me at first, but if it doesn’t scare me, I shouldn’t do it. When things get really easy and you start to do them with your eyes closed, they get very boring,” said Conway. “She was the most difficult thing to create. It is very hard to do something that is real, because people know how they should move. She is a real pretty puppet and definitely my favorite . . . next to the Gump.”

Most of the creatures were based on the John R. Neill illustrations from the original Oz books. There were some minor exceptions and the Gump was one of them. Originally, the Gump was a kind of goat with one deer antler. Murch pictured him more like a moose and moose he became. Still, it is very difficult to get a moose to talk.

“The Gump was mechanically the most difficult to make,” reported Conway. “He has a lot of dialogue and a lot of lips. We had to come up with something that would form syllables. Nick Rayburn, who did the close-up, mechanized heads for *Greystoke*, did the lip and head mechanism for him. He is all cable-controlled. Val Jones came up with the knitted fabric which covered the mechanicals. Without the fabric, I don’t think either of these puppets could have been done. It compresses and stretches without folding. If it is mounted on the neck taut, it gives and stretches like skin.” For Billina, each feather was inserted into the cloth. For the Gump, the fur was pulled through the material a little at a time.

“The Gump’s head is attached to a sofa and the whole thing flies through the air. We tried to give a bit of a galloping motion to his neck. In addition he can turn his head, wiggle his ears and, of course, talk. He’s a lot like me – even though I was only his mouth, I sort of coordinated the rest of it. It is very difficult to get a good organic look in something that is totally mechanical.”

It took eight people to manipulate all the cables for the



Top: *The Gump, a creature with moose-like qualities.*
Left: *Dorothy and Billina meet with Tik Tok, whose contortionist-portrayer is doubled inside the round body with his human head between his legs.*

Gump. The team had only two weeks of rehearsal before shooting. At first, “it was a nightmare,” Conway said. “Nothing was coming together. So, I tried to think of something that would pull everybody together. You really have to work as one to make it look right. I got a recording of Frank Sinatra’s ‘My Way’ to rehearse to and literally, within an hour everybody was doing it. It is a familiar song with a very predictable range of emotions. Responding to it got us working as a team.”

The other mostly mechanical creature is Jack Pumpkinhead. “Our work on Oz started with long talks with Walter about the personality of the various creatures. We talked about Jack and the look of his head. Walter had very specific ideas. He saw Jack as being imprisoned

Pumpkinhead is shown with the puppet crew operating during the grand procession scene. Left: Dorothy and a Wheeler, meanies with wheels instead of limbs.



within this constant grin. No matter what he felt or experienced, he would always be saddled with this grin. We went through quite a few finished, colored prototypes – non-mechanized – before we came up with the final version.”

Part of the time Jack Pumpkinhead is manipulated by Brian Henson, Jim Henson’s son, from a specially made cart. Brian would lie on his back and push himself and Jack around on the cart using his feet. “Jack was originally designed so that there was no movement in the head at all, but Gary Kurtz suggested that the head squash (argh!) and stretch to show surprise, so there is a very subtle movement, but that is all. Jack loses his head and it turns

over so we had several replacement heads and managed the scenes with cuts,” recalled Conway.

Tik Tok, the clockwork man, is not strictly mechanical. “Tik Tok is made out of fiberglass and is vacuum-plated to look like copper,” explained Conway. “It was a nice lightweight costume. Tim Rose did a lot of development on the radio control for Tic Tok. His head was radio-controlled but his hands were controlled from the inside by the performer.”

The performer in this case was required to be a contortionist. Imagine spending your day bent over with your head between your legs and your arms crossed over your chest. Then imagine walking around and trying to impart character to a little mechanical man from this position. Two men shared this demanding role, Michael Sundin and Peter Elliot. Elliot is best remembered for his portrayal of Silverbeard in *Greystoke*.

Elliot was not the only *Greystoke* cast member to find his way to *Oz*. The wicked witch’s henchmen, called Wheelers, are frightening creatures with wheels where their hands and feet should be. “The Wheelers were quite difficult. Their success required finding the right performers. We had speed skaters come in and they just didn’t have the strength to do

it. They couldn’t keep their bodies together. So we wound up hiring quite a few of the *Greystoke* people. They had spent two years of their lives on all fours. Their backs were strong, their arms were strong and they did a great job,” Conway says.

“The costumes had long, extended arms with wheels instead of hands. They had handbrakes in the arms so they could stop themselves. There were slight extensions for the legs. The performers were standing sort of *en pointe* and the wheels were on ratchets so the wheels wouldn’t go backwards. They actually picked it up quickly, but they were people who had never rollerskated before. They had no preconceived ideas about how things should be done. They were mimes and they just got down on all fours and knew they had to support themselves.”

The Scarecrow’s head and the Cowardly Lion’s head are partially radio-controlled and partially cable-controlled. The Lion, performed by former *Greystoke* ape John Alexander, wiggles his ears and also moves his mouth and eyes, mostly through the magic of radio control. A radio control requires the use of a separate channel for each movement. Usually one person handles the single control box. The same is true for cables. One person controls as many cables as he or she can. “The eyes – it is always nice to have one person control both the eye movement and upper and lower lids. It just seems to make it easier. It unifies that aspect of the face rather than spreading it too thin,” comments Conway.

The Tin Man is the only character not designed and built under Conway’s supervision. Production designer Norman Reynolds tried his hand at creature manufacturing and commissioned this particular one to be built out of tin and worn as a costume by a performer.

“Most of the screen time centers around Dorothy and this cast of mechanicals. It took over a year to build these creatures, but

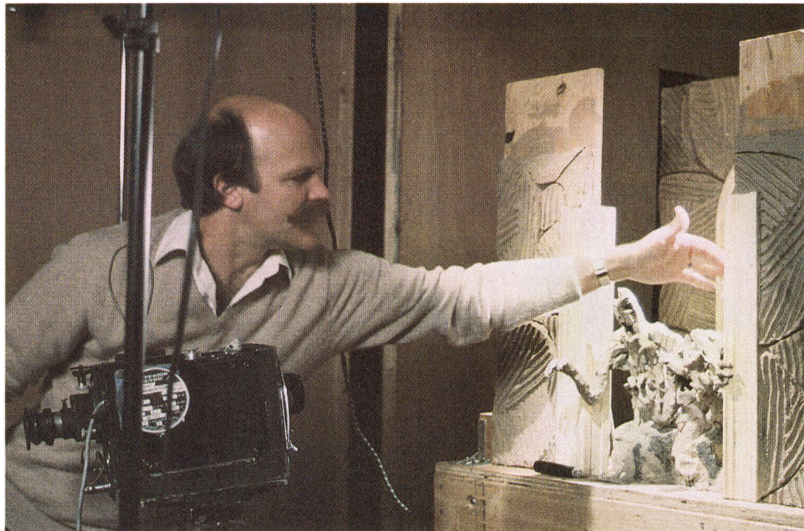
what we gained in that year was a dependable character and mechanism. We didn't have any breakdowns that took more than a few minutes to fix. We also didn't have backups for all the characters. We had several chickens, but there was only one Gump.

"One additional difficulty we had was the amount of time our characters are on screen. It is difficult to sustain the illusion or the belief in mechanical characters for long periods of time. If we had been able to incorporate the same set of "rules" for our chicken that they used in *Gremlins* – like no bright lights – or like *E.T.* – pull the blinds down to hide her – plus a relatively short amount of screen time, it would probably be an easier illusion to sustain. We are asking a lot of our audience.

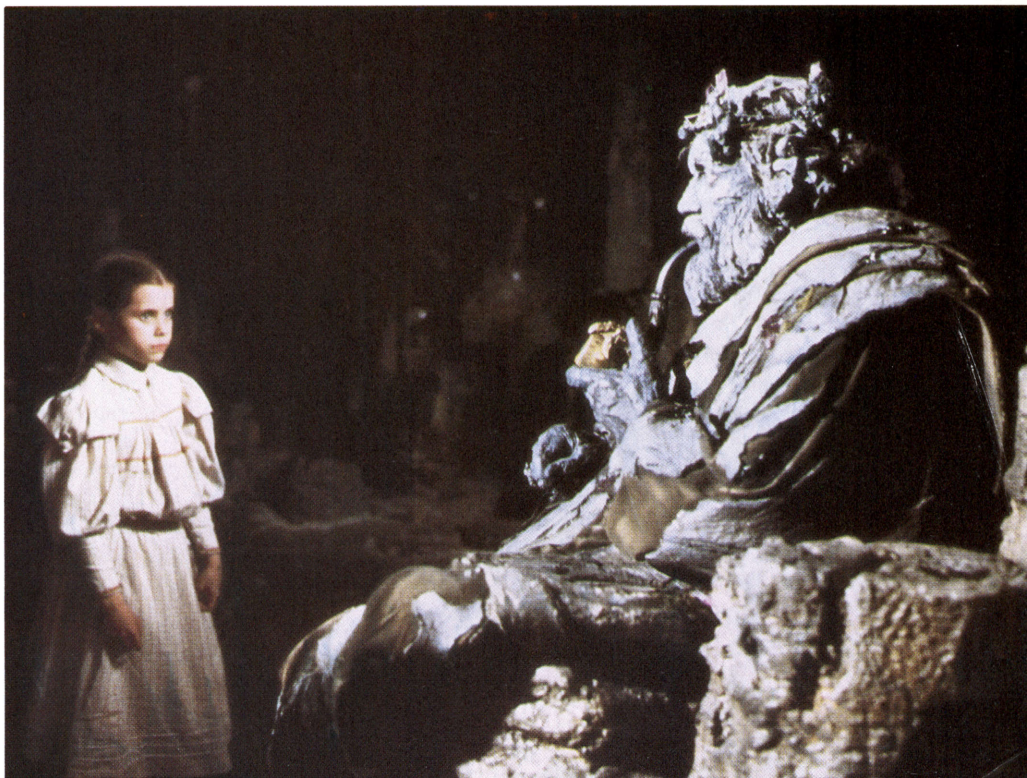
"I think that an important part of any effect, not just our stuff, is that it shouldn't scream magic at you. Audiences shouldn't be pulled away by the technology of it all. Hopefully they will just accept our creatures as characters in a good story," concluded Conway.

This is a film full of strange and wonderful creatures, not the least of which is the evil Nome King. He, however, was not an animatronic creature. From the beginning he was imagined as being able to evolve into a man of sorts right from the stones and rocks that make up his kingdom. This kind of on-screen evolution called for the very specialized talents of Oscar-winner Will Vinton and his company of clay animators, who use a process called claymation.

"What was incredibly different about this project was the total realism that Walter wanted," explained Vinton. "Claymation is not normally considered a realistic medium. For *Oz* we did not use bright colors. Everything is rock colors and we had to make special aggregates to get the textures and the scale right. In the end it has turned out to be quite fantastic and hopefully not like anything ever seen before.



Will Vinton examines lighting possibilities for Nome sculpture. Below: Bill Fiesterman studies a section of film in a 35mm viewer as he animates a close-up of the Nome King. Bottom: Dorothy encounters the Nome King.



The Nome King seen in detail. Realistic prosthetic eyes, modeled after the actor's eyes, were used for this sequence. Below: Jean Marsh as Princess Mombi.



"In the beginning, however, the problem was immense. How do you make rocks move realistically? A really interesting contradiction in terms."

Claymation is a time-consuming process that is akin to stop-motion animation and typical model photography. Using miniature sets and specially formulated clay, the film is shot one frame at a time. Between frames sculptors/animators resculpt the clay. "We use a motion control camera, but the heart of claymation is the totally hand done clay sculpting of the figures one frame at a time. In Oz sometimes it's just an eye or a hole or something that makes a face in rock move along and creep and evolve in different ways. We work off a miniature set very much as if it were miniature photography and model work except that

we add a dimension. We bring the set to life within itself."

Because of the complexities of compositing live-action and animation and of matching miniature sets to full-scale ones, Vinton employs a variety of techniques. They all start in the same place – the drawing board. "We plan really closely," he said. "We storyboard it, of course, but the essence of planning for us is shooting reference film. For example, Nicol Williamson plays the part and the voice of the Nome King. During principal photography when the others were on the set, we would do the reverse angles of Nicol, except instead of being in costume as the Nome King, he is in a track suit. It looked a little outrageous when we cut it all together.

"We shoot film and we shoot it tight. We shoot only the things we are concentrating on. Sometimes it's only a face. Then we cut that in with the rest of the film to get the pacing. The reference film becomes a guide to us for expressions and obviously, lip sync."

Vinton and his crew have taken the technique pretty far. For example, they shot an entire live-action reference film before they started their new feature-length film *Mark Twain*. "It is all black and white and very strange," said Vinton. "Sometimes it's just close-ups in a recording studio. Other times it's actors in costume going through the motions on a soundstage. We are not limited to what the actor can do. But there are always expressions and nice nuances the actors contribute. With Oz, we would discuss the reference film and Walter would say what he did like and what he didn't like about the performance. We would add things to it.

"Lots of times the Nomes evolve as they speak. We would discuss how it should happen. Then we write it all down on a basic animation log sheet. We have a record of the details of everything that is happening for every frame in the shot. By the

time we actually shoot everything has been pretty well planned."

Planning was vital, especially since the studios involved (Will Vinton Productions and EMI) were 5000 miles apart. Many of the shots contained both live action and animation elements. Many of those composites relied heavily on bi-packing, according to Vinton. "Something we don't do too often here, but they do quite a bit in Europe, is composite one image with another in a bi-pack camera. The images we have been able to do that way don't have quite the grain that the front-lit/back-lit shots do." Front-lit/back-lit is a standard technique for stop-motion animation and regular model photography. However, with stop-motion or claymation the back-lit frame has to be shot right after the front-lit frame to create the matte, because the movement of the sculpture cannot be precisely repeated. In model photography this technique is combined with a motion control camera that allows the exact repetition of the entire shot to get the matte.

"Also, for shooting composites, we made some little front screen projection alignment rigs that worked out really well. We would take a clip of a live-action length plate – having registered the front projection projector with the pins in the camera so that everything was perfectly aligned – then we put the plate in the projector. This would allow us – through the camera and the video taps on it – to build sets right in front of the camera that exactly matched the plate and the live-action image. We were able to get remarkably accurate images for compositing. It was one of the crucial things, especially for bi-pack composites – to be able to get it right so that we did not have to reduce the image or shift it over."

Conway and Vinton provided important pieces to the story of Oz, but David Watkin, the cinematographer, was responsible for a photographic frame to keep all

the pieces together. Watkin is a British cinematographer complete with the English sense of humor and a Vermonter's love of brevity and practicality. Working with a camera operator in the European tradition, he uses his talents to light the sets. His distinguished career spans 30 years and includes features like *Help!*, *A Delicate Balance*, *The Three Musketeers*, *Yentl*, and *Chariots of Fire*. Interviewed by telephone in his hotel room in Nairobi, Kenya where he is shooting Meryl Streep in *Out of Africa*, Watkin summed up his work on *Oz*: "I loved working on it! The fact that it was a fantasy was one of the things I loved."

Watkin was not the original choice for filming *Return to Oz*. "It started off with Freddie Francis. He was only on a short while and then he got off for some reason or another. It worked out very well because he had only done the Kansas stuff. So it really meant there was no change in style. Freddie had been shooting about four to six weeks. I took over, I think, in April."

Freddie Francis' Kansas location really wasn't Kansas any more. It was the Salisbury plain, legendary home of Stonehenge, transformed into the midwestern wheat fields. Much of the film was originally intended to be shot on location. Budget revisions brought about by Disney's financial battles in various takeover bids altered the plans. Locations were confined to the London area, and the large stages at EMI became the fantasy kingdom of Oz brought to life with the help of Watkin's camera.

There were three main sets: Mombi's Mirrored Palace, the Ornament room, the cave-like kingdom of the Nome King, a raging river set, and a few others. The Palace was very large, incredibly elegant and expensive. The mere description of it would make most cinematographers shudder. It was mirrored – wall to wall, ceiling and floor. But Watkin, by his own admission, has a strange philosophy: "I never find anything difficult. It can be interesting, but it

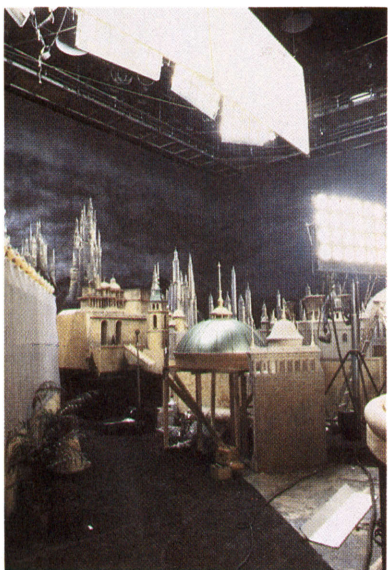


Dorothy (Fairuza Balk), Mombi II (Fiona Victory) and Tik Tok in the Mirrored Palace. Below: Interior of the Mirrored Palace.





Emerald City restored and miniatures of the exterior set of the restored Emerald City.



can only be difficult if it's impossible and if it's impossible it's difficult because you can't do it. Otherwise, it can be fun – but it's not difficult."

Given such an optimistic attitude, he described his solution to lighting and filming in a mirrored box in surprisingly few words. "You would think on the face of it all those mirrors would present problems – especially with

all the light. In point of fact, something like that can just as easily work for you as against you. Because it was a mirrored set – floor, ceiling and walls – we did angle some of the mirrors so that we didn't reflect the camera. We considered hiding the camera by cutting a hole in a mirror for the lens and attaching it to the front of the camera so that all that was reflected was another mirror, but we didn't have to do that.

"What was lovely about the lighting was that the key light I used for that set was on the ground, outside the window, aiming up at the ceiling. Unless you were at a 45 degree angle to that light you would never see it. It was like having an invisible light in the ceiling. It lit the whole room and gave us a terrific advantage. I lit practically the entire set with one key light."

According to Watkin, the Nome King's throne room was perhaps the most difficult set because it was located in the heart of a mountain, where there is no logical light source. "I tried this idea of having self-illuminating stalactites. It worked all right, even

though there was no clear rationale behind it. One nice thing was that Nicol Williamson began looking like Michelangelo's 'Moses.' That pleased me a great deal. I don't know if it pleased him at all."

Watkin has a philosophy about every aspect of his work. When asked about the camera, lenses and film he used, he had some unexpected comments: "The cameras I used were Arriflex BLs. The reason for that is they will accept Zeiss lenses, which are the best. To me what matters is not so much the camera but the lens. What the audience sees is the lens with the film behind it, so I always use a camera that will accept the lenses I want.

"The stock varied. I was using Kodak ... actually, you've hit on a very sore point. Kodak had marvelous filmstock, 5293. I shot *Yentl* on that. Then, for what I consider pretty unsound reasons, Kodak altered the stock to 5294. And almost everything that I liked about 93 disappeared. So I shot some 94 and 47. I am using the new Agfa 320 stock on *Out Of Africa* and it is absolutely sensational. It is better than 93 was. The whole point is it's ASA 320 and it is stunning."

For most of the people involved with the *Return to Oz*, the ghost of its ever popular predecessor was always lingering about. Early on, Lyle Conway watched a Technicolor print of *The Wizard of Oz* and wondered "What do we think we are doing?" But Watkin stated very matter-of-factly that he was not intimidated by the past. "It might intimidate the director, but not me. I've just got a job to do and it is always fun. I really like musicals, so I think it would have been nice if there were songs in it. I think it's a pity. On the other hand, Walter may be perfectly right not having any songs in it. This isn't a remake.

"If we had tried to do a remake, I wouldn't have been too keen about being involved in it. I'm not a great believer in remakes.

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They are never as good as the original. But this is a combination of two other Frank Baum books. It is a sequel – a totally different story.”

It is not just a different story. It is a different approach to a classic fairy tale. Photographing fairy tales is not easy. Cocteau believed that in fairy tales realism was the key to the suspension of disbelief. Watkin's experience on films like *Yentl* and *Chariots of Fire* probably honed his sense of realism but, he admits his efforts on *Oz* were not necessarily conscious.

“On any picture I am photographing there are two things I am concerned about. First is the style, which must fit that particular movie. You never impose a style, the style must belong. It evolves out of the truth of anything. If what you shoot is true then it will look right.

“In the case of a fantasy, one has a much wider range of choices that one can make because one isn't bound by reality. Don't misunderstand, you can't make it absurd. It must have some element of logic. It may be a different logic but it must be a logic. However, it isn't something I consciously plan. I think this realism or logic is something that comes naturally.” It is an integral part of the magic that transports us back to *Oz*.

Dorothy almost did not have the opportunity to *Return to Oz*. The film endured more than its share of problems. The production changed cinematographers about six weeks into the schedule. The director was fired and then rehired. The whole production was shut down for a time because of budget difficulties. So when Dorothy finally does journey to meet the Gump and the Nome King this June, she will take with her the

heartfelt best wishes of an impressive group of true believers: People like Francis Coppola and George Lucas, who intervened on behalf of Murch and helped him get and keep the production rolling; Murch himself, whose vision and total devotion to the project were respected by everyone involved; and people like Lyle Conway, David Watkin, and Will Vinton, whose talents are representative of the high quality of the production. It was not easy, but bringing a dream to life never is.

“Billina, I don't think we're in Kansas anymore.” ■



*The reclusive Baron
Frankenstein
emerges into society
to introduce his
"niece" to the
proper people.*

Stephen Burum and

The Bride

George Turner



"What we have done, basically, is Mary Shelley's book reworked with the emphasis thrown to the bride of the monster," Stephen Burum, ASC, said of his new picture, *The Bride*. This decidedly different version of the *Frankenstein* theme was filmed in England for Columbia Pictures release. It was produced by Victor Draai, directed by Franc Roddam and written by Lloyd Fonvielle.

Mrs. Shelley wrote her classic novel, subtitled "or, the Modern Prometheus," in 1916-18, and it was first adapted for the screen by Thomas A. Edison, Inc., as a highly praised one-reeler in 1910. It has inspired numerous other films, the most famous being those made by Universal in the Thirties with Colin Clive as Baron Frankenstein and Boris Karloff as his creature made from dead bodies. In the second of these, *Bride of Frankenstein* (1935), Elsa Lanchester portrayed a female monster created as a companion to the lonely and fearsome original creation. This picture provided inspiration for *The Bride*, although there is little similarity between the two. The new film shies away from the "horror" aspects of the yarn to stress human drama. As director of photography, Burum provides a great deal of the beauty and atmosphere so necessary to the effective telling of a tale of fantasy.

Burum is one of the younger leading cinematographers, a classmate of Francis Ford Coppola at the UCLA Film School. After doing the second unit photography for *Apocalypse Now* and *The Black Stallion*, he was director of photography of *The Escape Artist*, *The Entity*,

Something Wicked This Way Comes, *The Outsiders*, *Rumblefish* and *Body Double*.

"The interesting thing is that the elements are so unusual," Burum said of *The Bride*. "Here we have Jennifer Beals, of *Flashdance*, and Sting, lead singer of *The Police*, - a rock music group from England - in this highly philosophical picture. It takes place in Hungary in the 1840s. Frankenstein isn't a mad scientist, but he's somewhat of a social outcast. He creates Jennifer for the monster, Clancy Brown, but she is frightened and the monster runs away. The monster meets a dwarf on the road and they join a circus. Meanwhile, Frankenstein is educating the girl, unlike the other women of that era. Thus both creatures are being educated, one formally, while the other is on the road, so to speak, learning in the school of hard knocks. Once Jennifer gains a lot of knowledge - especially philosophical knowledge - she begins to ask questions. Frankenstein doesn't want to tell her he created her. He's now able to be accepted in society because of his charming 'niece,' and they go out to parties. When she gets interested in other men, he's not very happy.

"All this is told intelligently and loaded with wonderful philosophical discussions."

Obviously, *The Bride* isn't the usual *genre* piece. Director Roddam summed it up at the start of production: "My ambition is to give the audience something outside common experience."

Such an audience can expect something more than ordinary cinematography.

Burum was on the picture from May 27 to October 6, 1984. "We made almost all the exteriors in France in under 40 days. The rest was filmed on stages at Shepperton Studio Centre in Middlesex. All of the interiors were constructed sets with the exceptions of an interior of a church in France and a French tavern."

The French locations were selected initially by the director, Franc Roddam, who traveled

through Germany, France, Austria and Hungary for several months. *The Bride* is set in Budapest in 1840, rather than in Mrs. Shelley's 1816 Switzerland.

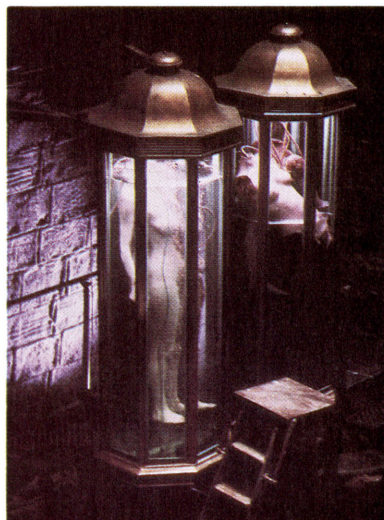
"Budapest was really made up of several different places in France," Burum explained. "The big main square is at Sarlat-la-Caneda, a historic city in the Perigord region of south-central France. Carcassone is an ancient medieval walled city located on a hill like an old crusaders' fortress. We used it for the big long-shots of the city and the ramparts, and we built the circus set there." Carcassone is one of only a handful of Western European cities which has kept its original medieval architecture intact, with no modernization to spoil the vistas. "Other scenes were made at the old town of Perouge, near Lyon, and at a real chateau in Clermont Ferrand, Orcival.

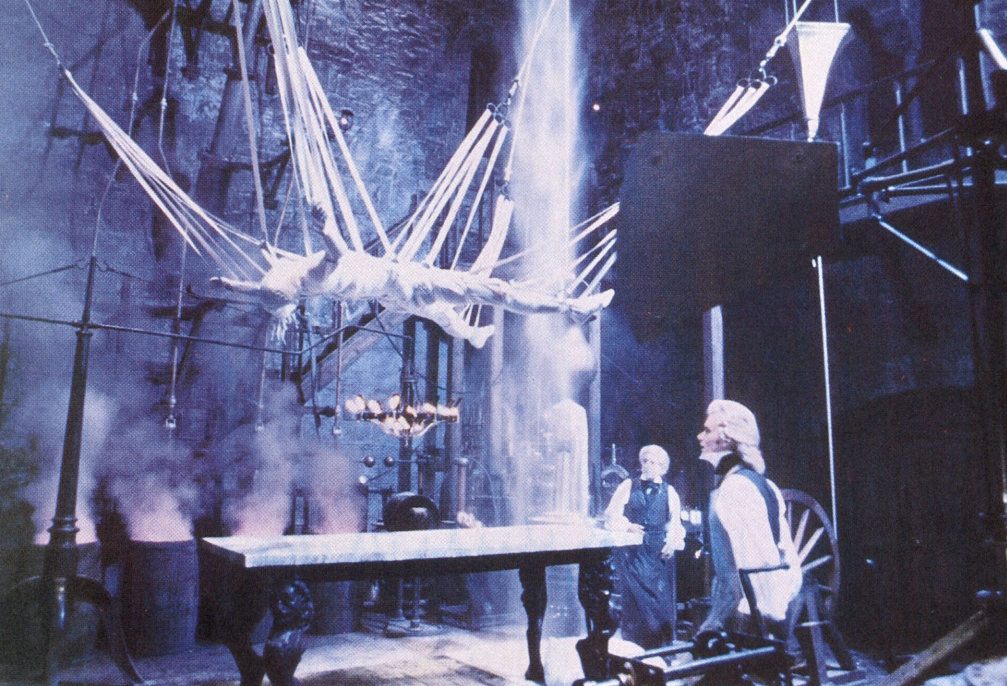
"We chose places that gave us room to stretch and gave us a 360° latitude so that we didn't have to limit ourselves to cramped views. We wanted to be able to get fresh, spontaneous things. Unplanned things come up all the time. Nobody can plan them all, so you have to give yourself leeway and use these elements in a creative way. The whole trick is to plan it to give yourself enough room.

"We built a tower on the side of the chateau and added a section to join the garage to the main house to make it look larger. Two French painters who had no theatrical experience painted the stone work on the plaster sides and made the place look better

The lights in the windows are photofloods.

Mood lighting at its best in Frankenstein's laboratory.





The laboratory scenes are suffused with an eerie blue light. Above, the body to be endowed with life. Below, the monster rages at Frankenstein and his new creation.



and more real than ever. Their usual work was in restoring paintings for museums, and they were amazing."

Arriflex BLs were used throughout production with Eastman 5247 and 5294 negative. The basic equipment was assembled in England and sent to the French locations on trucks via boat-train.

"Shooting in those medieval French towns with their narrow streets meant that we had to use little trucks, and we couldn't have giant lights and generators," Burum said. "Therefore, we used Ianiro HMIs in lighting the street scenes, day and night. For the effect of night lights in the buildings

we put ordinary R-40 photofloods behind the windows. I try to keep lighting as simple and straightforward as possible. The more lights there are, the more complicated it becomes, and unnecessary lights cast false shadows, so it's usually best to do the simplest thing you can with lights. I plan the basic equipment that will handle most of the situations, then add when I have to for the big situations.

"Sometimes it's possible to put all the heavier equipment at the first, then as you're done with it you can get rid of the extra stuff. But, of course, you can't always do it. The unexpected is always

happening – that's what makes picture making interesting. We had our big package of equipment at Carcassonne doing the night scenes with the circus and lighting the walls of the city."

Burum pointed out that many equipment decisions are necessitated by financial considerations.

"A lot of what you choose to do is an economic choice. An *ordinary* picture costs \$10 million today. *Ten million!* So we naturally want to do everything as economically as possible. There's no way to cut costs in the above-the-line area such as actors and executives – that can't be touched, so we try to save in the physical area. You have to be a clever administrator to get the most bang for your buck. Otherwise I would have taken arc lights instead of HMIs to France, because arc lights are still the best lights – but expensive and cumbersome. Old fashioned? Perhaps, but it's hard to re-invent the hammer or improve on a simple screwdriver.

"Our overall lighting plan was to stay away from an electric light look. Our lighting should *appear* to come from candles, coal oil lamps, fireplaces and natural sources. Basically, we gave the picture three 'looks': warm candlelight and firelight, cold blue moonlight, and a strange 'silvery' light. This last is very unusual – a good example is the scene where the baron teaches Jennifer to eat food. It's a really pure silver look, designed to contrast with the dark and warm stuff, to keep it hard, sharp, cold and not warm or comforting. We placed arcs outside the windows for the teaching scenes. We used this silvery look in a lot of the exteriors as well, sort of overexposed but not so much as to lose detail.

"In contrast to this is the fancy party at the countess's house, which was shot in a light suggesting Vermeer and Rembrandt and others of the Dutch school of painting. There were beautiful gowns and falling confetti and very formal compositions



The Baron and the Bride (Sting and Jennifer Beals)

resembling big, historic paintings. This was the only section where we did formalized shots. Elsewhere the compositions are not as balanced but are rather asymmetrical. The very symmetrical party scenes were intended to catch the quality of the high society of that day."

A dramatic highlight of the film is the laboratory sequence in which the bride is endowed with life. According to Burum, these scenes were achieved in a surprisingly straightforward manner.

"The lighting in the lab was pretty basic. We brought in eight or nine lightning machines, because Frankenstein used the lightning to zap everybody to life. I had a cue light next to the camera so I could cue the technicians with the lightning machines.

"I don't like to work at impractically low light levels," Burum stated emphatically. "If you work too low it makes it difficult to control darker areas. In the fire sequences in the burning tower, for example, I wanted to



Quaintly beautiful settings can be menacing when wetted down, fogged in and lighted for effect.



The backlit canvas provides a dramatic color scheme for scenes in the circus big top.



see both flame details and the textures of faces. Therefore, I simulated the fire on people's faces and balanced the lighting so you can see the flame as well.

"There are certain things people expect to see, and if you violate naturalism audiences resent it. You shouldn't have to shoot closeups at $f/1.4$, where the actor can't shake his head or shift his weight. It inhibits acting. Why penalize him for something mechanical? The mechanics should serve the picture. I have done things like that when there was no choice, but I had to sacrifice a lot of freedom and control. But if you can control the environment, don't handicap yourself. On *The Bride* I usually shot at $f/4$."

"In photographing the actors, I tried to let the audience see them interacting with one another in two-shots and groupings, not just a bunch of big-head closeups that the editor could put together. I think everyone will be

surprised to see these interesting people acting and reacting as they would in a stage play.

"The only time we used storyboards to any extent was for the creation sequence, because it was so complicated. It is thoroughly articulated – probably the most complete creation that has been done to date. Jim Whiting designed the lab equipment and it

looks great. We used two cameras and it took about 10 days to shoot. The blue light gave it a look much different from the other parts of the film."

Burum described an unusual video system which was a great help to him on *The Bride*. It is a small wireless assist device.

"When Francis Ford Coppola was directing *Rumblefish* in Oklahoma he wanted this outfit, and we came up with it. The little wireless is hooked up to a tiny TV. The little transmitter is the size of a package of cigarettes and the TV set will fit into your pocket. It's like having an extra viewfinder that can be seen by the director, the director of photography and the operator. It gives you a solid way to communicate as well as an added amount of control, like operating yourself. Sometimes it's hard to explain to an operator how you want a scene to go; this way, you can show him. Sometimes it saves another take, where perhaps the operator thinks another is needed – maybe the actors

get inspired and deviate from the plan but it really works out well and doesn't need a retake.

"The battery operated system is much better than a hard wire – there's no danger of AC power problems or getting anybody electrocuted. It uses a lot of juice; you have to change batteries about twice a day, but it's worth it. It uses the regular Arri video camera and the transmitters are the ones used with Steadicam for follow-focus."

A type of British equipment which Burum found invaluable while working in Europe is a highly efficient system of scaffolding.

"It is made up of pipes and clamps, rather like an erector set, because they don't have lumber abundantly as we do here. With it you can build anything anywhere, quickly. We had a truck full of two-inch pipes and four basic kinds of clamps. There is a right angle clamp, another that joins two cubes together at the ends, a swivel clamp that gives any angle, and one that clamps to wood. With them we could build light towers, supports for plaster walls, camera platforms off the sides of buildings and bridges, and they even build catwalks with them. They are somewhat similar to the speed rail system that our special effects people use here. They are handled by people called 'riggers' and they work fabulously. They are entirely reusable, the storage space is much smaller than conventional materials, and they're very cost-effective. They would be a terrific asset to the small, independent filmmaker to use anytime, anywhere."

In discussing equipment, Burum often referred to a subject that is a source of distress throughout the movie industry: the need for standardization of tools.

"It's a real problem all over the world and it needs to be addressed. Here, we've learned to live with the problems that come from electrical and grip equipment

that is not standardized. There are five or six big manufacturers of lighting equipment, all with different systems. They *have to* get together. One of the standards in this country is that bigger lights use 1½-inch pins that fit in a 1-inch hole. But some use 1-inch pins. When Columbia and Warners consolidated their facilities, Columbia used 1-inch and Warners used 1½-inch pins. You ask the electrical department which they have the most of and they say, 'Mostly Columbia.' So later you run out of Columbia equipment and have to use some Warner stuff and you either have 1½-inch pins that won't fit in the 1-inch holes, or they put 1-inch pins in the 1½-inch holes and tighten down and strip the threads so it doesn't work right in the 1-inch hole.

"When you need a light fast and have to look for other equipment, it's time-consuming for the best boys to have to sort everything out, doing labor that shouldn't need to be done. And there are two sizes of scrims and if you're in a hurry and one is too big for the light they jam it in, ruining a piece of equipment. Sometimes a mismatched scrim falls through the light from the rafters onto the set.

"In international filmmaking you get the worst mix of equipment imaginable, like five Ianiros, five Mole-Richardsons, five Bardwell-McAlisters, and so on. Then you have to have a particular stand for each light instead of just the number you need with some lights hanging. The trucks have to carry more stands, diffusers, plugs, and all these different adapters. If you want to rent supplementary equipment on location and it doesn't work, you have to cut the wiring and replace the plugs with new ones that match. Grip equipment is second worst. It all means more trucks, more people, more equipment. We work under a tyranny of non-standardization that costs every show hundreds of thousands of dollars."

Like most cinematographers, Burum is adamant about the need for standardization in another area, that of widescreen format.

"Everybody should get together on this," he emphasized. "The two fine things about being a cameraman are composition and lighting. Yet we shoot in ratios of 1.33:1, 1.66:1, 1.75:1, 1.85:1, 2.36:1 – and then send the films to all those theaters with different kinds of screens. It's like trimming the Mona Lisa down to fit a certain wall. We spend all this time trying to get the composition perfect, then in the theater it's lost. Only at a studio screening room or at the Academy is it seen the way it's supposed to be. The result is a snobbery by Hollywood toward the rest of the world, as though we're saying Hollywood has a right to see films properly but nobody else does.

"The 1.33 frame was great and VistaVision was an honest improvement, but then, for the wrong reasons, we got all these other formats. If you don't know where the edges are, how can you control framing? It is a critical situation. We have lost a tremendous artistic tool."

There were no blue screen shots or other special photographic effects during production, Burum said, except for one miniature scene in which the

tower explodes. The scene was staged at Shepperton.

"It was a large miniature, about 30 feet high, which we shot at 60 fps. We had it built outdoors, next to the studio. The electricians rigged it one day, then I went out and lit it. Next day at noon we set up the cameras and that night we trimmed it up and shot it."

The scenes inside the "big top" have a striking, warm color effect due to the outside light showing through the canvas. "We started shooting these scenes in Carcassonne with natural sunlight coming through the tent," Burum revealed. "Unfortunately, we had a problem with Clancy Brown's makeup, which was applied with surgical adhesive. He became allergic to the adhesive – we learned we had received a bad batch of the latex material, which is treated with ammonia. Ordinarily the ammonia is removed, but in this instance it wasn't. As a result, Clancy's face broke out in a rash. We had to do



Careful balancing of light was necessary to do justice to the actors in a sequence with flames. Below, the exploding tower is a large miniature photographed at Shepperton.

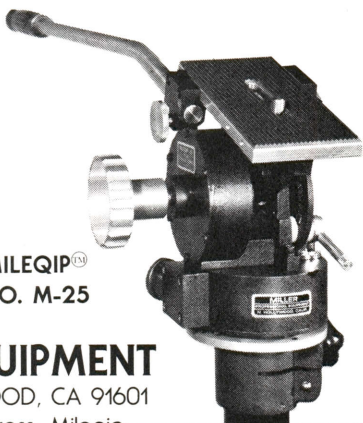


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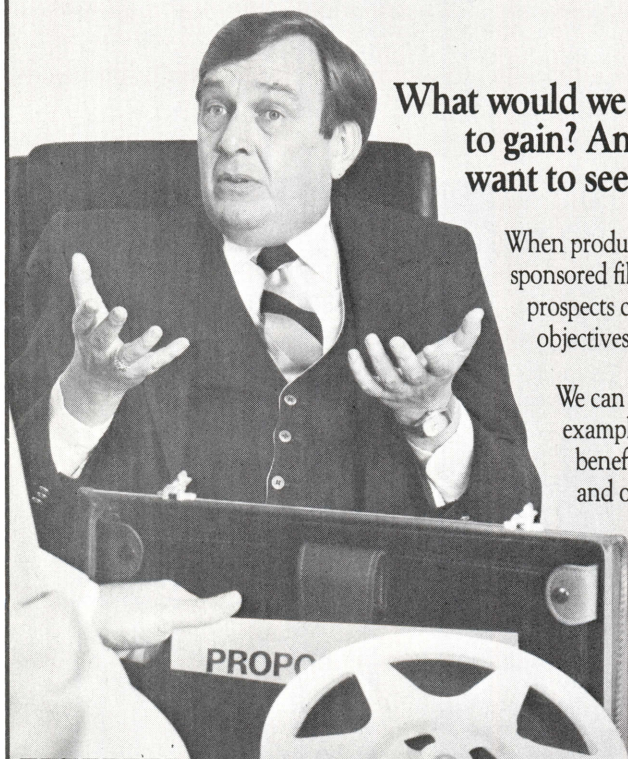


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it again in England. There the sky was overcast and we couldn't get that sunlight we wanted. Then we started filming at night with artificial lighting – and the tent caught fire! We had to evacuate quickly, including three cameras, as it burned to the ground in about three minutes. There was no panic; we just picked up our equipment and walked out."

The production had gone over its schedule and Burum was committed to photograph *St. Elmo's Fire* in the States for Columbia.

"Ernest Day, BSC, did the additional photography for *The Bride*, and he matched our style very well," Burum said of the distinguished British cinematographer. "The real test of a cameraman's art is for him to have to match someone else's work. It's much easier to do things your own way. He did a terrific job."

Burum found *St. Elmo's Fire* relaxing after the rigors of *The Bride*. "Its style is a complete antithesis of *The Bride*, witty and modern and a sort of cross between *Vogue* and *Architectural Digest*. There was no muss, no fuss. Part was shot in Washington, D.C., and the rest here in Hollywood."

Upon finishing *St. Elmo's Fire*, Burum returned to England to supervise print timing for *The Bride*, finishing that chore in mid-March. He is enthusiastic about the picture.

"It deals with universal, timeless, philosophical problems. The use of Jennifer Beals and Sting – the girl from *Flashdance* and a big rock star – suggest a youth exploitation film. But it's really a class picture about people discovering the world, more like *Anne of the Thousand Days* than a 'horror' picture."

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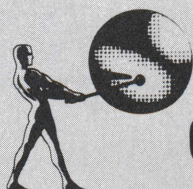
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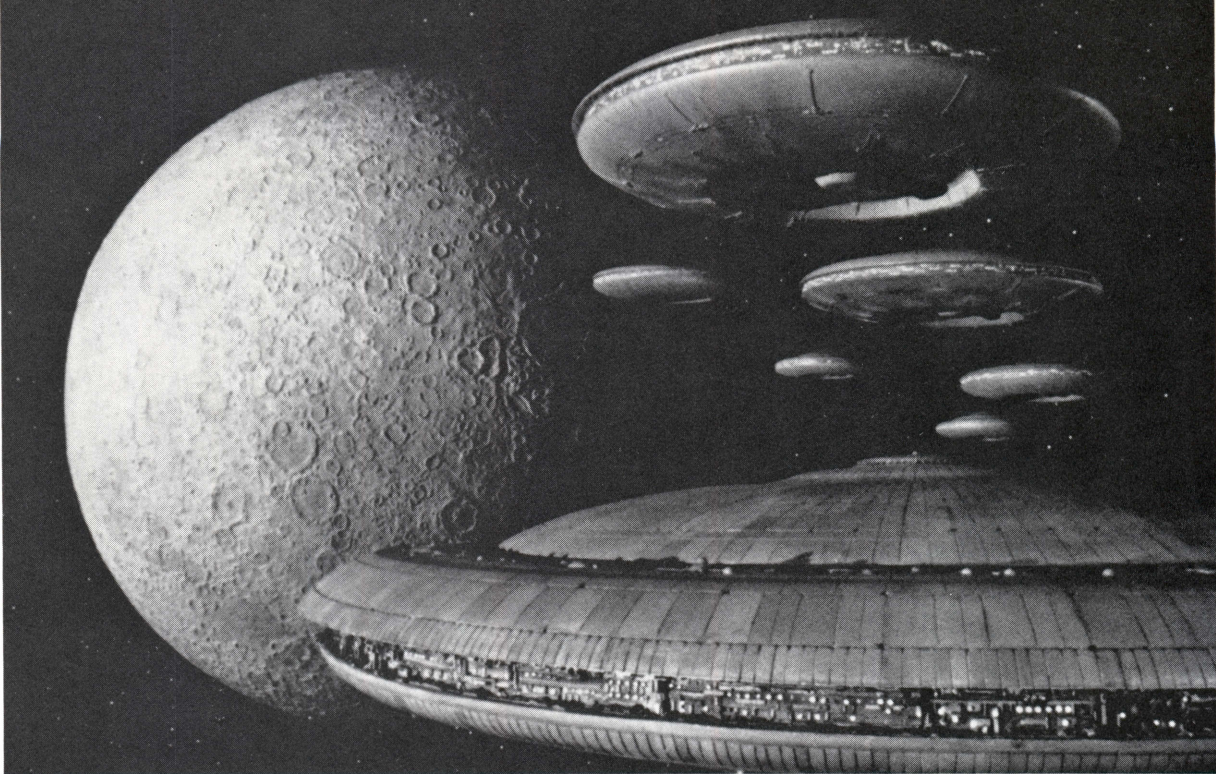
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Original Negative Motion Control Composites For "V"

Over the past few years, large-scale, hardware-intensive science fiction has been in short supply on network television. The Warner Brothers/NBC mini-series "V" (which first aired in the Spring of 1983) and "V – The Final Battle" (which followed a year later) were two outstanding exceptions to this trend. In fact, they represented the only major ventures into network science fiction since "Battlestar Gallactica" and "Buck Rogers" were canceled early in the decade. The visual effects for the two mini-series were apportioned among several effects houses, including Pacific Title & Optical, Coast Effects, M-3, Dream Quest, Greg Jein, Inc. and David Stipes Productions.

Both of the "V" mini-series scored strongly in the Nielsen ratings, persuading NBC to order 13 new one-hour episodes of the show to air as a regular series for the 1984–85 season. In July of 1984, actual production began for the series. As in the two preceding mini-series, David Stipes Productions of North Hollywood and Pacific Title & Optical were called in by

Warners to supply many of the key visual effects.

As one of DSP's two motion control cameramen, my involvement with the "V" series actually began in the first months of 1984 with the effects for "V – The Final Battle." I was to share motion control responsibilities with my colleague, Michael Karp. Mike and I were assigned two motion control shots of the three-mile-wide alien saucer flying through space near the Earth. However, Warner Brothers did not have the budget to put the elements (Earth, saucer, and stars) together as an optical. Mike, David Stipes, and I conferred with the show's visual effects supervisor, Richard Bennett, and a solution was quickly settled upon: the two motion control scenes would be composited in-camera, on original negative.

An "original negative composite" is simply any image created by exposing two or more separate elements (individual images) onto one strip of film, without the use of an optical printer. Any in-camera double exposure is technically an "original negative composite." In our application of the term,

though, it represented something far more involved.

Why would an original negative composite be preferable to a conventional optical? First, the process can often be less expensive than opticals, since there are not as many steps involved, and the lab processes are kept to a minimum. For the same reason, compositing on original negative can also be faster than generating an optical, an important consideration, given the short deadlines of television production. Finally, the image quality can not be surpassed, since the composite is (by definition) a first-generation negative which can be seamlessly edited with the live action.

The original negative approach is not without its limitations, of course. First, if all the elements are being photographed with motion control, the equipment can be tied up for virtually the duration of work on the scene, until the actual comp is finished (which could be a problem if there are other effects waiting to use the same equipment). Second, all lighting of models, sets, and any other elements to be

Special Effects

used must be perfected before they can be shot onto the comp negative since there's no opportunity to go back and fix them afterwards.

To make things harder, it is necessary to completely "black-out" the set before shooting, since it will be impractical, if not impossible, to roto-scope a "garbage matte" to hold out unwanted flags, gobos, or lights later on in the process. This aspect is even harder to deal with if the motion control move is long and/or radical. A third drawback is the fact that there is a limit to the number of matted elements which can be combined on one strip of negative if a bi-pack matte is being used. It all depends upon how many separate elements can be shot onto the hi-contrast holdout matte. Most sensible people would draw the line at "one," with "two" being the absolute ceiling. Finally, it is a potentially risky process; once the comp has been started, every element must be shot perfectly. One mistake, and all the elements photographed up to that point will suddenly be worthless.

In view of these limitations, in-camera motion control compositing is clearly not suited to every shot. But under the right circumstances, the process can yield superb results, proving itself well worth the effort.

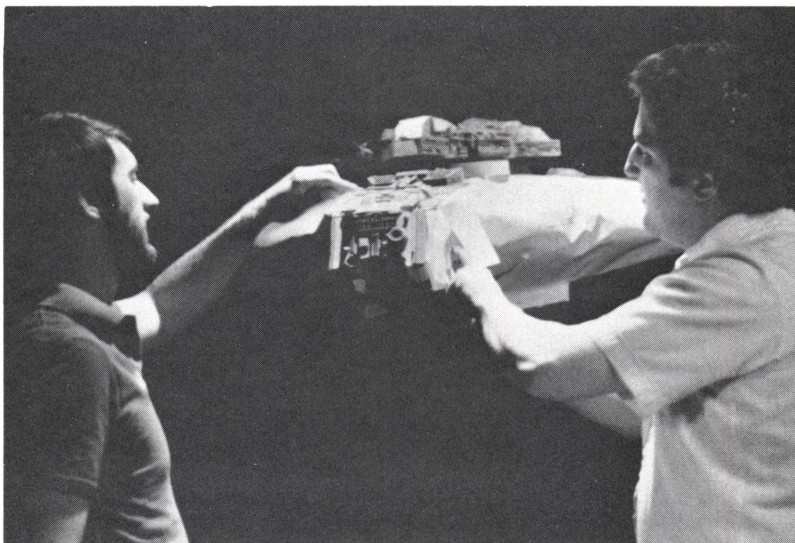
In our work for "V" we employed two different original negative techniques. The first of these processes involved the use of "frontlight/front-light" mattes with a bi-packed latent-image negative. The second approach was a technique which utilized multiple pass photography with self-matting subjects.

Mike Karp and I received our first experience with "frontlight/front-light" while generating a scene for "Final Battle." The scene opens with a slowly drifting starfield. At the top of the frame, the rim of the huge alien mother ship enters. Soon the entire saucer has moved into view, and then it gradually recedes into the distance. The camera pans to follow as the Earth drifts into the scene and the starship



Top, one element of the armada scene. Earth is a 10-inch NASA photo mounted on a motion control linear actuator. Center, the star element of the scene. The earth photo, now unlit, creates its own matte. Below, the scene continues as the moon begins to roll into view. Page opposite, the climax of the armada scene as the alien fleet is revealed on the far side of the moon. This is an in-camera, motion control composite.

Richard Bennett (left), visual effects supervisor, and Dale Fay, chief modelmaker, prepare the Triax miniature for the matte pass by wrapping it in white paper.



slowly banks in preparation for orbital insertion.

Warner Brothers had provided us with a 30-inch diameter model of the alien saucer, built by Greg Jein. We mounted the miniature on a motorized gear head at one end of our 32-foot motion control track. Black velvet was hung behind the saucer to provide a totally black background.

The camera we used was a modified Mitchell outfitted with a custom follow-focus L-base and mounted on DSP's motion control camera mover. All the motion channels were controlled by DSP's newly-installed Tondreau Motion Control Computer. At the other end of the track, I erected a four-by-eight foot starfield, composed of black aluminum foil with tiny backlit pinholes for "stars." Our "Earth" was a 10-inch NASA photograph, which I cut out and mounted on a gobo arm stuck through the foil. The arm held the Earth photo a few inches in front of the "stars," thus permitting us to light the cutout without having to worry about spill light polluting the starfield. Since the disk of the "Earth" hid the gobo arm when seen from the front, the photo seemed to hang before the starfield in total defiance of gravity.

With the model saucer set up at one end of the track, and the starfield and Earth at the opposite end, we had the basic subjects for our scene. Now the trick was to get those elements together. Mike and I proceeded to program the saucer motion control move.

We worked out a program and then rehearsed the move a couple of times, taking turns riding the camera mover to preview the action. Once satisfied, we loaded the magazine with Eastman 5369 hi-contrast negative, fired up the set lights, and proceeded to shoot the saucer move. The hi-con stock was then placed in DSP's "dip-tank" and developed on the premises. A few minutes later we had the still-moist negative threaded into the Moviola and were meticulously examining the move.

The saucer move looked promising, but it was hard to judge whether or not it was really working without the Earth and starfield for reference. Mike and I immediately returned to the stage, turned the camera around, and programmed a pan/tilt move on the starfield and Earth. We shot the background move onto 5369, developed it in the diptank, and then bi-packed it in the moviola with the saucer footage. Since we were using negative, all the elements showed up as dark objects against a clear field, making it easy to see how they were interacting with each other. As it turned out, our first test was in the ballpark, but not close enough. We re-programmed, and within a couple more tries we had the moves on both the saucer and the background perfected.

As we refined the saucer move, we were also busy lighting it for color photography. We chose 5247 ECN for its fine grain characteristics, and lit the subject for f/22 in order to assure maximum depth of field with our 20mm. Nikkor lens. Since the camera

mover used stepper motors and some of the channels were fairly geared down, the move we programmed had the effect of limiting our exposure speed to no faster than two seconds. With such long exposures, lighting for f/22 was never a problem.

Because we would need to shoot our matte pass immediately after exposing our color "glamour" pass on the saucer, we had to set up our matte lights alongside our "glamour" lights. While the glamour pass would feature careful modeling on the spaceship, the matte pass demanded that the saucer be lit totally flat. In some cases, this meant simply pulling a few gels and/or scrims from the glamour lights. But to fill other areas, we had to set up specific matte lights. In the end, the model was surrounded by over a dozen lamps of every size.

Lighting the spaceship was only half the challenge. The next thing we had to do was block all the lights out of the camera's view for the entire length of the scene. Since the camera ended up at the far end of the track near the tail of the move and the wide lens saw virtually the entire stage, blacking the out the set was no easy task. Flags and flats did some of the work, but they could not hide everything. After several minutes of brainstorming, Mike and I hit upon a neat and simple trick: we would attach a small filter holder to the front of the lens, and then slide a pre-cut "garbage mask" into the holder to block out peripheral lights, stands, and spill. Making the mask required a couple more previews, and we learned that one mask would not be sufficient due to the constantly changing relationship of the saucer to the frame during the move. We ended up cutting two masks out of black cardboard, and then carefully practiced inserting and pulling them out at the specified frame counts so that each mask would only block out the appropriate areas of the scene, without ever encroaching on the model itself.

When the moves and lighting on the saucer, Earth and stars were finally approved, we embarked on the actual composite. We loaded the camera with the 5247 stock and I made a sync punch at the head of the take. We then proceeded to shoot the saucer move, inserting and pulling out the two

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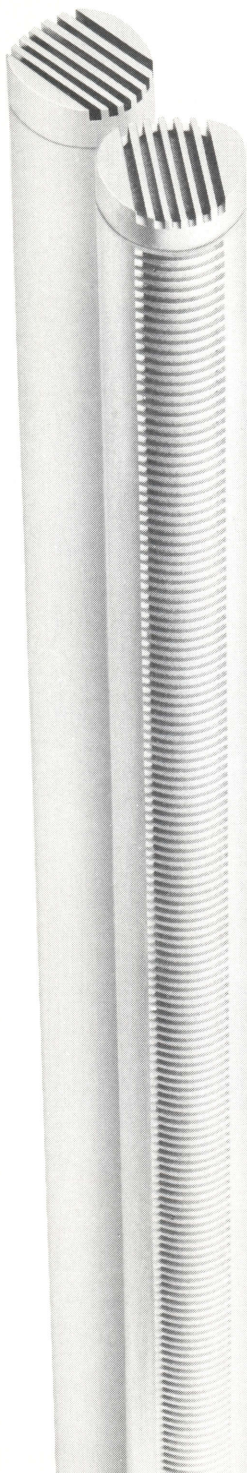
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garbage masks on cue. When the move was completed, I made a tail sync punch, downloaded the film, rewound the exposed footage heads out, and then canned it and labeled it "Latent Image Neg." Mike and I then shot a second take on a new roll of negative, just in case something went wrong with the first later in the process. This second take was also rewound and canned.

Immediately upon canning our second "glamour" take, we started setting up to shoot our hi-contrast matte. Time was of the essence here. A perfect fit between the matte and the glamour pass is critical. If too many hours elapse between the shooting of those elements, there is a good chance that the model might settle slightly on its mount, or the camera might get jostled, or any number of other things might go wrong. And if the elements don't fit perfectly, the displacement will show up on film as an ugly black matte line.

The model saucer's color was mostly grey, so simply lighting the ship hot and flat was not enough to give us an even matte. We had to actually paint the model white. There is a special flat white latex paint generically known as "peel-coat" (and sold under the brand name "Spray-Lat") specifically formulated for this purpose. First we sprayed the model with a heavy misting of Frekote 1711 mold release so that we would be able to easily peel off the paint after the shot was completed. We then applied a thin coat of the white latex to the model, covering most visible surfaces. Certain areas, too detailed and textured to paint, were covered with white paper tape instead. Care had to be taken not to let the paint become lumpy or thick, since such irregularities would show up as matte lines in the composite. And, of course, special care had to be taken not to jog the model even the slightest bit under all this handling. It was a very nervous procedure, to say the least.

With the model coated and drying, I loaded the camera with Eastman 5369 hi-contrast stock and made a sync punch at the head to match the color passes. The hi-con lights were turned on and Mike gave the computer the "Shoot Shot" command. The camera mover and model mover went through their programmed moves, precisely repeating the motions they had

executed for the earlier passes. When the move was finished, I punched a tail sync, canned the film, and our driver rushed the exposed hi-con negative to Pacific Title for processing (since our in-house dip-tank was suitable only for quick-and-dirty tests.)

A couple of hours later, we were hunched over the editing bench, carefully scrutinizing the freshly developed matte. It was a pretty good matte—a solid black saucer isolated against a clear background. There were only a few light areas inside the perimeter of the saucer, indicating a slight exposure drop-off. Since such a variance in density could potentially allow background stars to ghost through the saucer, it was necessary to hand-ink those areas. A rapidograph pen and some India ink did the trick, and we were soon ready to load the glamour and matte elements into the bi-pack magazine.

Loading the bi-pack magazine was something of a process in itself. It seems one of the many dangers of shooting bi-pack effects is the potential for static buildup and discharge during the shot—or even while loading the magazine. Such discharges show up as blue flashes on the developed print, and can ruin a full day's work. Static electricity was of particular concern at the time we were shooting, since we were experiencing a period of unusually dry and windy weather.

Several steps were taken to minimize the risk of static discharge. First, the matte was cleaned and treated with Tuff-Coat, which helps inhibit static buildup. Then, just prior to loading the bi-pack, I "washed down" the entire darkroom, wiping the counter, walls, and rewinds with a clean, damp cloth. I then humidified the atmosphere using a bottle of water and an atomizing spray nozzle. By the time I was finished it felt more like an Amazon rain forest than a darkroom, but it was perfectly suited for loading a bi-pack.

I loaded the bi-pack, making sure the sync punches on the matte and the latent image saucer footage lined up properly. I then threaded the camera, being careful to leave a slight gap at the loops between the matte and the undeveloped neg, helping to further minimize the static risk. Once threaded, we turned the camera mover to face the

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starfield and Earth background, and started shooting.

Inside the camera, the undeveloped negative containing the image of the saucer was now being re-exposed, this time to Earth and stars. The matte of the saucer was suspended, frame by frame in perfect synchronization, in front of the latent image negative. The matte effectively masked or "held out" the area in each frame occupied by the saucer, preventing the stars and Earth from being double-exposed on top of it. When the background move was completed, I opened the camera, checked the tail sync punches, and was relieved to find they had lined up perfectly.

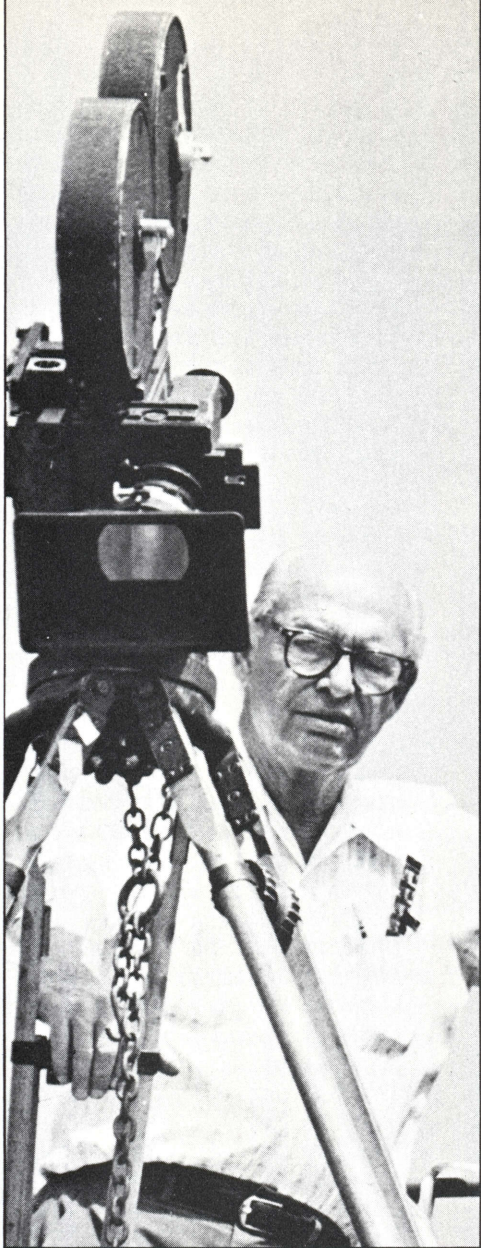
The next morning we nervously ran the dailies on the Moviola, and were pleased to find that the composite was a complete success – a beautiful original negative comp. The footage was sent over to Warners and they immediately cut it into the show. The scene was used extensively in promos for "Final Battle" and during the mini-series it was seen twice, printed both backwards and forwards.

We used the same technique for another scene in "Final Battle," this time depicting the mother ship skimming over the upper atmosphere of the Earth, and then rushing toward the camera before veering off into space.

A few months later, Warners brought us the effects for the "V" weekly series, and we had the opportunity to use the original negative bi-pack approach one more time. On this occasion, the subject was an alien doomsday machine – a "nine-miles-in-diameter" semi-triangular starship dubbed the "Triax." The model, built by DSP's chief model maker Dale Fay, was about four feet wide and extremely detailed, making it a poor candidate for the peel-coat matte treatment. Fortunately, since the ship was only to be seen against stars and the blackness of space, a tightly fitting matte was not quite so critical. We ended up wrapping the entire ship in white paper and paper tape. It looked like a deformed Egyptian mummy by the time we were finished with it, but it served our purposes and rendered a perfectly acceptable matte.

There is a second approach to creating negative motion control composites. This technique is somewhat

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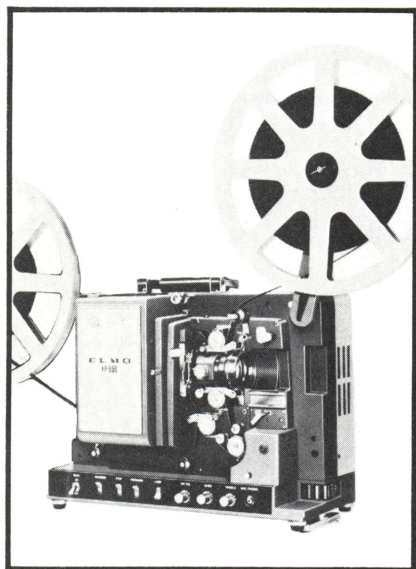
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simpler than the bi-pack approach, since it involves the photography of subjects (miniatures) which are self-matting. We used this technique for a scene in the "V" weekly series, and it offers a nearly textbook example of the method.

The storyboards described a scene which opens on a view of the Earth as seen from space. The camera slowly starts to pull away, and the moon rolls into the frame, ominously filling the screen and eclipsing the Earth. Soon we are on the far side of the moon. As the camera continues to pull back, we reveal one of the three-mile-wide alien mother ships – and then another, and another, until we see a virtual armada lurking on the far side of the moon.

As an optical, the scene would have been approached as a series of separate elements, with Greg Jein's 30-inch saucer model re-photographed seven times on seven strips of film, with seven individual mattes, plus the Earth element and its matte, the moon model and its matte, and the starfield background. All the separate elements would have to be programmed and shot with the moves simulating the appropriate perspective shifts and then comped on an optical printer with special care to assure that the right elements were seen crossing over each other. In short, it would have been an optical nightmare, would have taken several arduous weeks to shoot and composite, and would have cost as much as an entire episode of the series. There had to be an easier way.

There was an easier way: original negative. We decided to composite the whole scene in-camera, using forced-perspective (diminishing scale) miniatures and a large practical starfield at the back of the set. When properly configured, the scene would be virtually "comped" in one take (although two passes would actually be needed.)

Richard Bennett was once again visual effects supervisor, while David Stipes engineered the scene and took on director of photography duties. As before, I was placed in charge of programming the motion control moves (Mike Karp, at the time, was assigned to another project.)

Our first step in designing the shot was to mock-up the scene with foam-core cut-outs of the saucers and

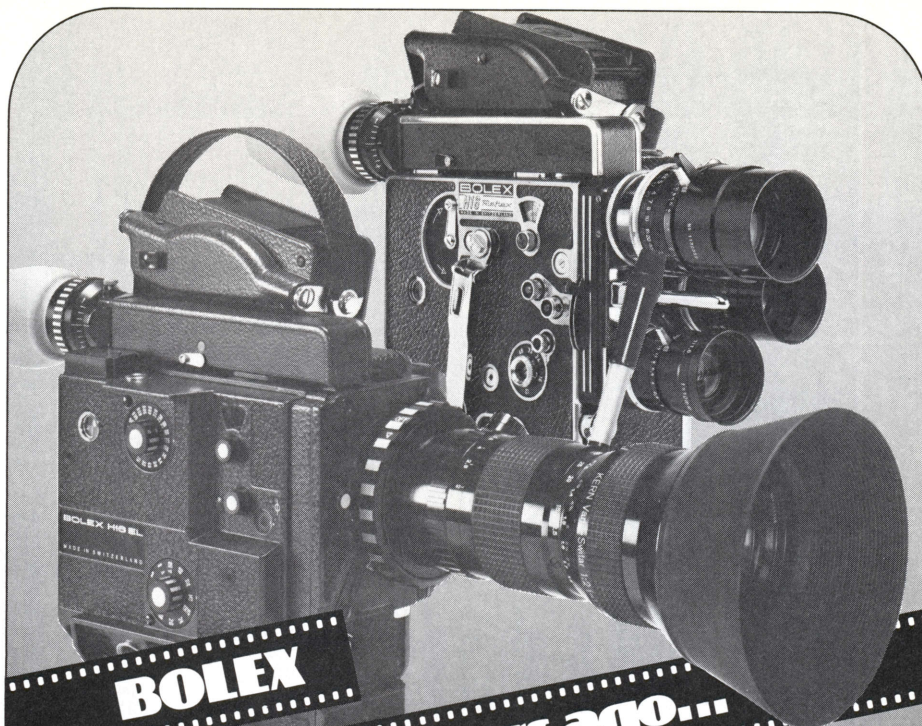
moon. The mock-up, when viewed through the camera, provided us with nearly all the information we needed about the correct scales for the forced perspective models. We determined that the largest model would need to be about 30 inches in diameter, and the smallest would measure barely three inches, while the moon model would need to be a full 36 inches across.

For the moon model, we acquired a 36-inch plexiglass hemisphere (since we were never to see the entire moon, it was necessary to construct only the half of the moon which faced the camera.) DSP staff artist Mark Kolodziejczyk set to work modeling the half-globe, creating lunar features out of modeling paste. Marc referred to volumes of NASA photographs in order to make the features as authentic as possible. When he finished three weeks later, the completed moonscape was accurate down to its tiny craters.

As Marc was putting the finishing touches on the moon model, Dale Fay was busy constructing the flying saucer armada. The 30-inch model – the one built by Greg Jein for "Final Battle" – was used as a template, from which Dale was able to scale down the six forced-perspective models. Dale used a lathe to carve these "mini-saucers" out of wood. Once the models had been carved, sanded, and primed, Dale and Marc shared the painstaking task of painting and detailing the saucers to match the Jein original.

Meanwhile, David, Richard, and I were busy building the starfield. It was a familiar configuration: a light wooden frame covered with heavy-duty aluminum foil, painted black, backed with tracing paper, and evenly lit from behind. The stars themselves were simple pin-holes, punched through the foil. What set this starfield apart from our previous ones was the size: eight feet tall and fifteen feet wide. The huge scale was important; since the starfield had to be visible behind the models on the set throughout the entire scene.

I salvaged the cut-out of the Earth we had used for "Final Battle" and mounted it on a motion control linear actuator which had been stuck through the starfield. As before, the disk of the Earth hid the ram which was suspending it in front of the stars. I then



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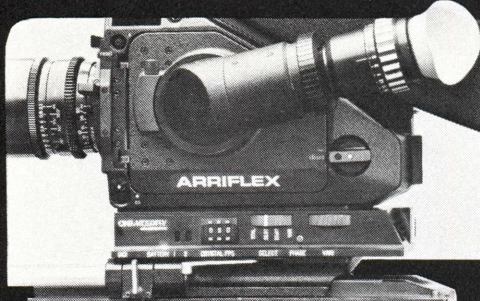
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programmed the move channel so that, as the shot progressed, the Earth would be pulled backwards toward the stars. This motion would help to convey a sense of vast perspective, since the Earth would seem to be dropping away, while the stars themselves would not be diminishing. After a few seconds, the camera mover would pick up the motion and continue it as a dolly pull-back past the moon. I worked out an overlapping curve program which would make the transition seamless.

We mounted Marc's moon model near the Earth, and then positioned the mother ship fleet in front of the moon. The model saucers were mounted on horizontal poles, which we covered with black velvet in order to render them invisible. Since the camera would be moving along a more-or-less horizontal/linear path during the take, the horizontal poles would not obscure any of the stars through the course of the move. As before, the ability to shoot black-and-white move tests and develop them in-house was a great help.

Although we could see stars, Earth, moon, and saucers all at the same time through the viewfinder, it was decided that the stars should be shot as a separate in-camera pass (this second pass making it officially an "original negative composite"). The decision to shoot in separate passes was necessary for three reasons: First, the stars required a slightly brighter exposure than the foreground models; a separate pass would allow us to shoot the stars with a wider aperture opening. Secondly, the current move was programmed to keep the models always in sharp focus, unfortunately causing the stars to go soft at the extremes of the move. A separate pass for the starfield could utilize a different focus program to keep the stars constantly sharp. Finally, although we were careful about flagging the spill from the model lights, it was impossible to prevent some spill from polluting the surface of the starfield. A two-pass approach could remedy this problem as well.

I programmed a new follow-focus program for the stars, and we then loaded the camera and prepared to shoot. Again, 5247 was the film stock of choice. Unlike the bi-pack approach, however, there was no need to punch a head-sync, since we would not be downloading the film until the comp

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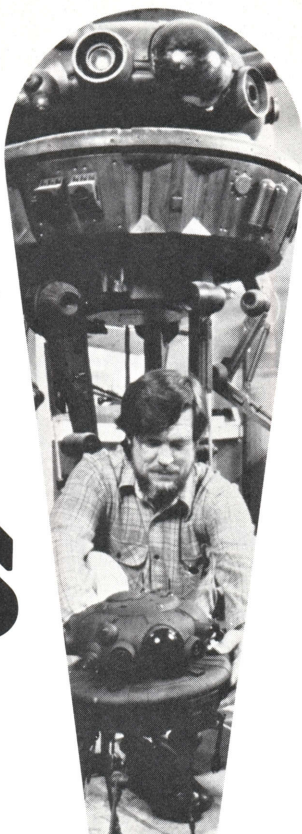
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was finished. However, it was important that both the computer and camera frame counters be set to zero, so that we would have a reference by which to keep the separate passes synchronized.

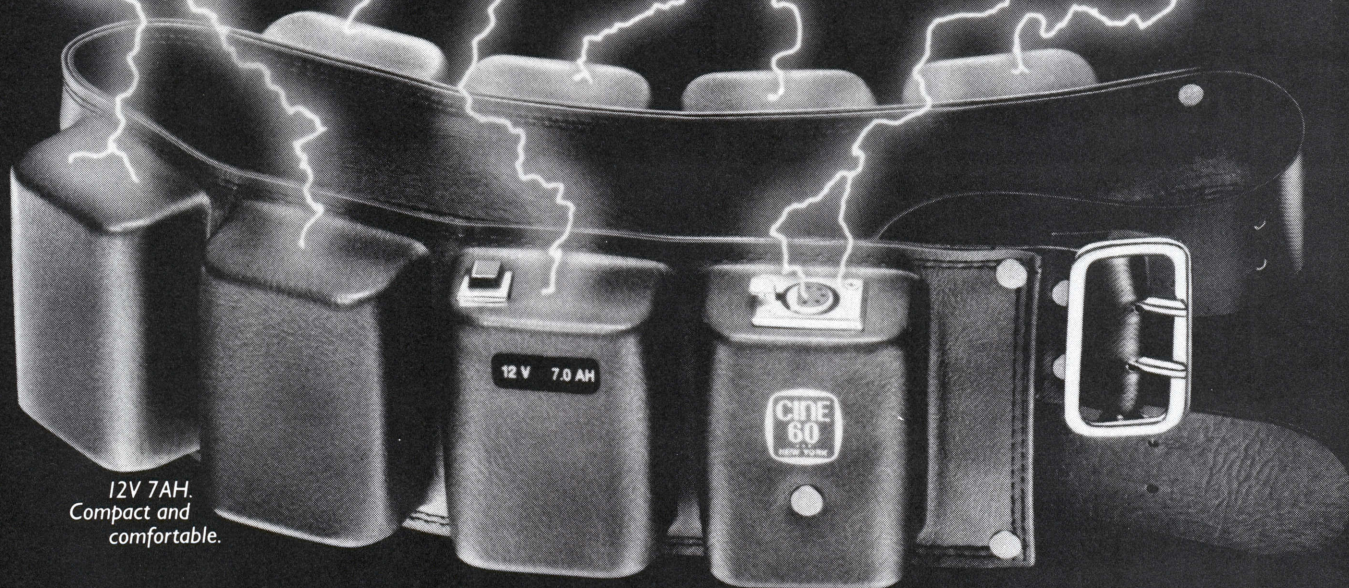
Our first pass was the "model" exposure, in which all the models, along with the Earth cut-out, were illuminated. The starfield was left dark, and black velvet was draped in front of it to absorb the spill from the model lights. I loaded the move program (which had the focus weighted for the miniatures) and gave the computer a "shoot-shot" command. When the move was completed, we backwound the film to zero. I sent the camera mover back to its start position and loaded the star-focus program into the computer's memory.

The starfield was undraped, the model lights were turned off, and the stars were illuminated. With the models now dark, they appeared as black silhouettes against the stars, effectively providing their own hold-out mattes. David re-set the camera aperture for the star exposure, and I gave the computer its "shoot shot." With that pass, the comp was finished.

There was a standing ovation in the screening room when the effect was first projected for Warners and NBC executives. The shot appeared in nearly every "V" promo before the series debuted. It is now seen at the start of every weekly episode as the first image in the opening montage. And it ranks among one of our personal favorites at DSP due to its simplicity and effectiveness, despite the apparent complexity of the image.

Although DSP's use of original negative motion control composites has been largely confined to television work, the approach can be equally effective for feature projects. When used properly, the technique can provide first-generation composites without the expense and time-consuming processes involved in opticals. Of course, the technique is not suited to every type of motion control shot, and often a conventional optical will be preferable. A skilled visual effects director must always use the solution most appropriate to the scene in question. But when the circumstances are right, original negative motion control can be the perfect alternative to opticals. ■

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Multi-Camera Work on *Cheers*

Cheers is a hit and an anachronism, one of the last live audience television shows to be produced on film.

"We liked the look of film," director James Burrows said. "We were doing a bar and we wanted it to look as pretty as possible. Film has a softness to it that tape doesn't have."

Cheers is filmed in segments about five minutes long with four cameras recording various angles simultaneously. Above the stage, 64 lights illuminate practically every area of the set.

"On a multicamera shoot, we can't have light stands on the floor," explained John Finger, director of photography, who is something of a Hollywood fixture himself. (He began his varied career imprinting the title boards used in silents.)

"On *Cheers*," Finger said, "we use an oblie light and an eye light on the camera, operated by a 30-volt battery. When there were cables coming to the dollies, we had them running off 110 AC. The chargeable batteries are large and bulky but at least we don't have the cables dragging around. The oblies have 30-volt bulbs rather than 110-volt bulbs." These camera-mounted fill lights provide clean, high-quality close-ups.

"The lights are controlled by rheostat," Finger said, "so you don't snap them on and off and you don't have a sudden change of light in the scene which would be visible on film. However, you can't control the eye lights as far as density is concerned."

"I usually mark down in a pad the points at which I want the eye lights or oblies on. I keep one electrician with each dolly, give him the notes and tell him when I want the lights on and off. It takes a bit of watching."

"Back-cross" lighting throws the shadows towards the front of the set, producing a low-key look that is still light enough for comedy.



Photos by Kim Gottlieb-Walker

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On the set of *Cheers* at Paramount – four cameras and 64 light units bring the scenes to life.

"Your keys come from the back cross," Finger explained, "and you're fighting camera shadows all the time. Therefore, you can't have a front-cross key. This way, you eliminate both the camera and the mike shadow. The back-cross key functions as a back light for the person sitting opposite and as a key for the person you're photographing. When two people sit opposite each other delivering lines, the back-cross key for one works as a back light for the other."

"The basic problem with multiple-camera shooting," Finger noted, "is trying to get two close-ups or even three close-ups at the same time. It's always a problem of keeping the back light from becoming overpowering."

During the initial planning of the series, the "look" of the bar was worked out by the producers and crew. Several lighting schemes were tried and the producers decided to keep things a bit on the dark side. The set, they reasoned, should look more like a bar than a restaurant.

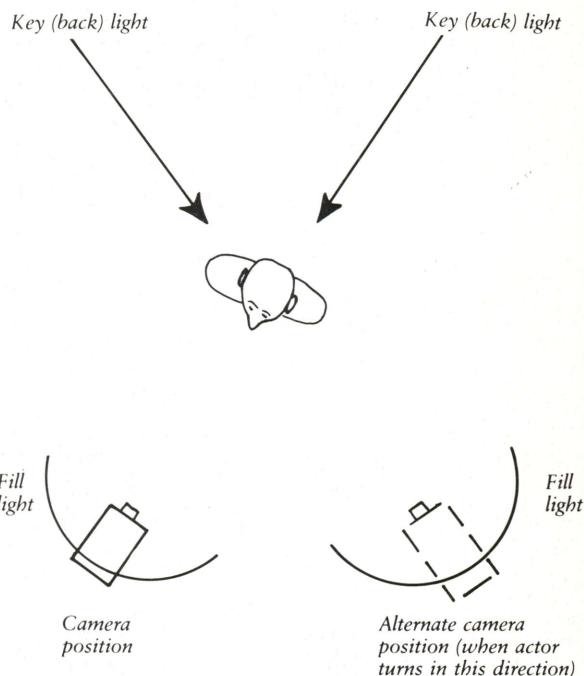
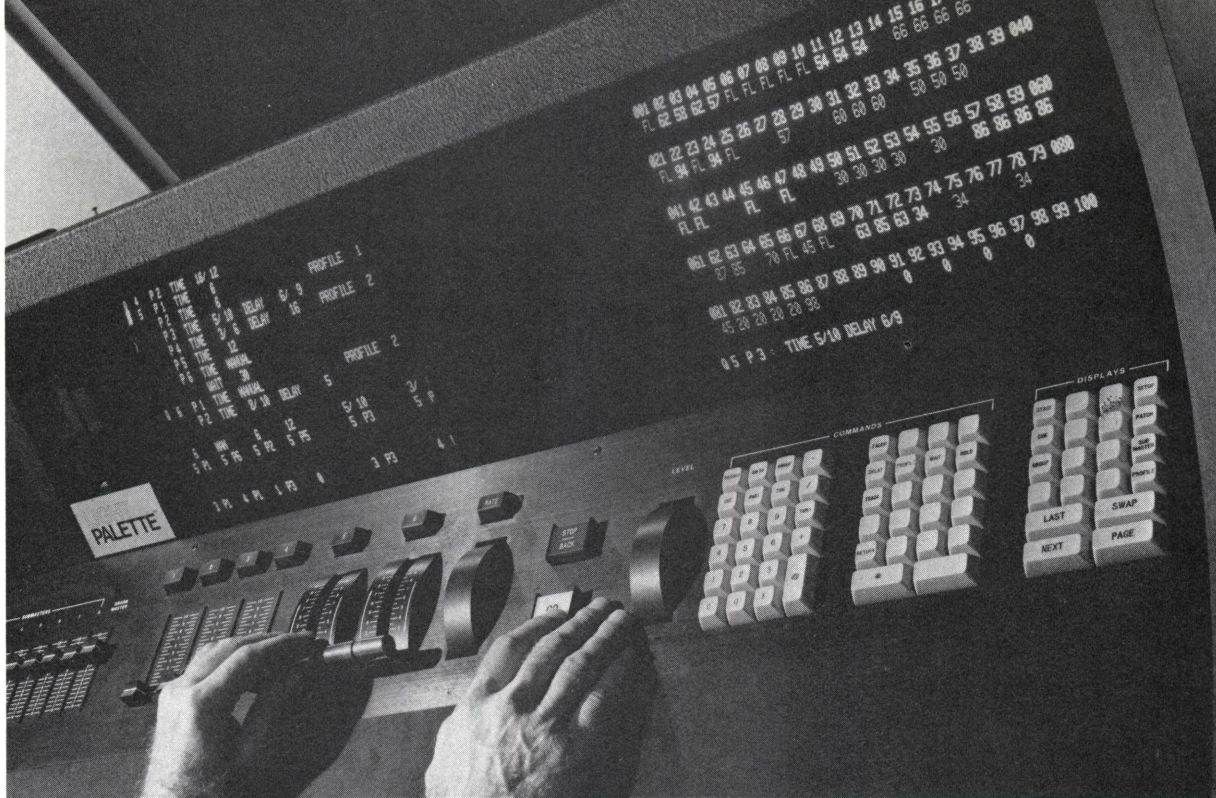


Fig 1. Back-Cross Lighting (Simplified)



The Strand-Century Light Palette lighting board used on *Cheers*.

Cheers uses a Strand-Century digital lighting control board (called a "Palette") to store and recall lighting information. Each of the lights used on the set can be assigned a power level and each complete lighting setup is assigned a number which can be called up in seconds.

The lighting system and gaffer Bob Thomas get along very well together. When Walt Myers came on board as dimmer operator, he had never before used a computerized board. Thomas taught him everything he needed to handle the basic show in one week.

"If I were using the old dump boards as I did in the past," Thomas said, "it would sometimes take three people, that's six hands, to make a light change. On this digital board, we have 64 100-amp dimmers and can go up to 60 light cues if we want to. It's very simple, fast and quiet. We don't hear switches banging up in the audience. This is all electronic and the dimmer is in an air-conditioned room off the stage."

Although the digital board can and does dim lights for special purposes, general practice on *Cheers* is to burn the globes at fixed power levels.

"We do not dim down," Thomas said, "we do it in clusters or groups of lights and we're up to 3200 Kelvin at all times." This is the same

technique of group lighting often used with videotape. But on tape, lights dimmed up to 40% or 60% power can be balanced. Because *Cheers* is on film, only the required groups are lit, and always at 3200 Kelvin.

Since the activity in a bar usually takes place as the sun is going down, there are three basic lighting plans representing full day, late afternoon and night. A handful of lighting setups has been programmed into the board to provide these looks.

The first is a low-key setup used as the audience is being seated.

"It's lower key than we can film," Thomas said, "but it makes the set look like a bar."

"The second cue is full daylight," he continued. "The whole set is lit, the windows are hot and the sun is pouring in. The next cue is just a little under that, slightly lower key. Cue three is late afternoon, the outside light drops down, there's more shadow detail and we're cutting down the crosses coming through the windows. Inside the set, there's very little change, maybe just a couple of lights drop out and in some spots, the actors will pass through a shadowed area and back into the light again."

The fourth setup is completely down. All the pictures in the bar are lit and there is only a single light source outside, a small lamp on the

wall which represents night light.

There are pre-programmed cues which drop out groups of lights as an actor flips a wall switch on the set. Once all the lights have been turned off, one or two crosses are left above the set, silhouetting the scene against the night light coming through the windows.

The remaining light cues are used to illuminate smaller sets (an office and a poolroom) and provide two lighting setups on the same stage quickly and easily. This was done during a recent episode when Shelly Long made a telephone call from Rome (day) to Ted Danson back in Boston (night).

Sliding potentiometers (called submasters) on the dimmer board can control smaller groups of lights as needed.

"If an actor is walking into an area where light is needed for that one shot only," Bob Thomas said, "three or four lights can be controlled with a submaster, brought up and dropped out again once the actor has left that area. It might be a back light, a cross and a fill. Sometimes it will only be a single light. It depends on how well they're lit and from what angles. They're always being rounded or flattened out to provide a proper exposure."

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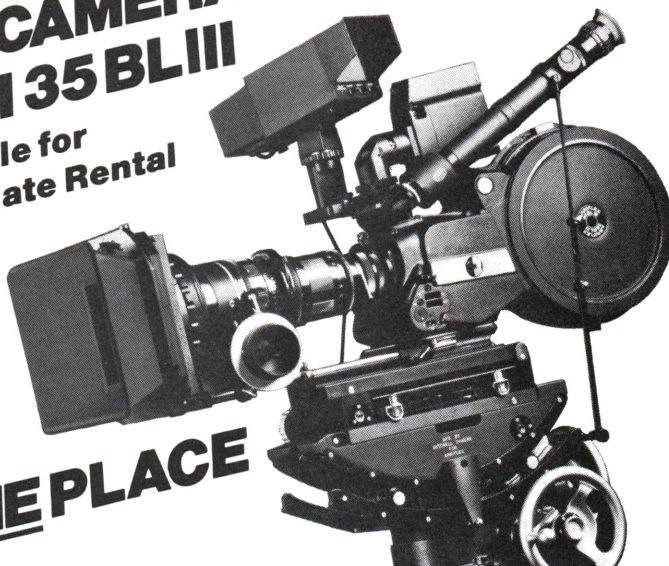


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"I'm on the middle part of the second season and globes I bought on the first season are just starting to go now," Thomas noted. This was during the filming of the 65th episode of *Cheers*. "During rehearsal, I'm at around 40% power. It's comfortable on the set and the life expectancy of the globe is tremendously increased. On blocking day, we work at close to 50% power."

During the week, lamps are changed and plugged in to arrange the required groups. On shooting days (Tuesdays) there is a rehearsal in the early afternoon during which the set is carefully examined. If the blocking has changed, the lighting is altered to allow for the new moves. The crew works from four until six, tuning up the lighting with stand-ins; the dress rehearsal is the last crack they get at it.

Throughout the first season, the cast was learning to work with several cameras simultaneously and they now watch for their key light and avoid casting shadows on each other.

"We can't light them so that if they move six inches to one side, they're out of their light," Thomas said. "A larger area has to be covered."

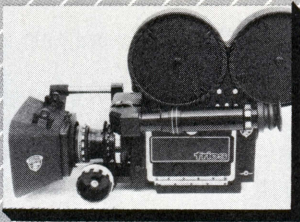
The performers are very sensitive to the lighting at this point. If Ted Danson is standing near Shelley Long, he will often lean his body to one side, allowing her key light to come through from the back cross. (In the stop areas where lines are delivered, the actors are usually rounded out at 100 to 125 foot-candles).

Important sequences are performed in those areas of the set best illuminated by the pre-programmed lighting setups.

"Inside the bar," John Finger said, "is one of those areas because the bartender is one of the main characters. The regulars have a location where they always sit, and the station where the girls pick up their drinks is another."

"Then we have a couple of tables used by the bar patrons. These are downstage so you can get close-ups of the people seated there."

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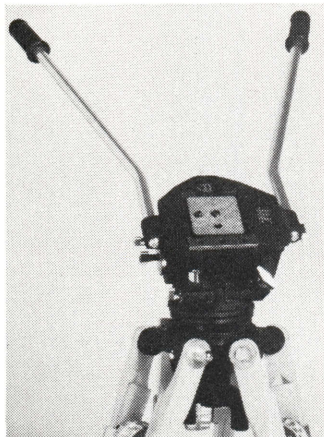
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"If you seated them too far upstage, you couldn't get the cameras in there for the close-ups. You're stuck with the profile when they're too far upstage."

"You like to have the actors close to the audience," said James Burrows. "I'm concerned about the home audience and worried about the studio audience, as well. You want the studio audience to be able to see everything. When there is important dialogue it helps to have it delivered downstage. The corners of the bar are very good and the two tables downstage are important. Sometimes we'll go into the poolroom for important dialogue. I only have the one set, so I like to take full advantage of it."

"During blocking," John Finger said, "if there is a problem, we'll tell the director. He places his people for the best dramatic effect and if we see problems, the actors can be placed in a different spot so they can be properly lit. But they have to be kept close together for a master shot. That's what's different in single camera productions, you can spread everybody out and get a raking shot. Here, you can't do that much of the time. The cameras can't always get in close enough to separate people even with the zoom lenses."

"With four cameras," Bob Thomas said, "there is time to be creative. You just don't have the time for single camera shoots unless it's a big, big feature. With single cameras, it's go, go, go. There's 50 setups a day. Here," he laughed, "you at least have time to visit the restroom occasionally."

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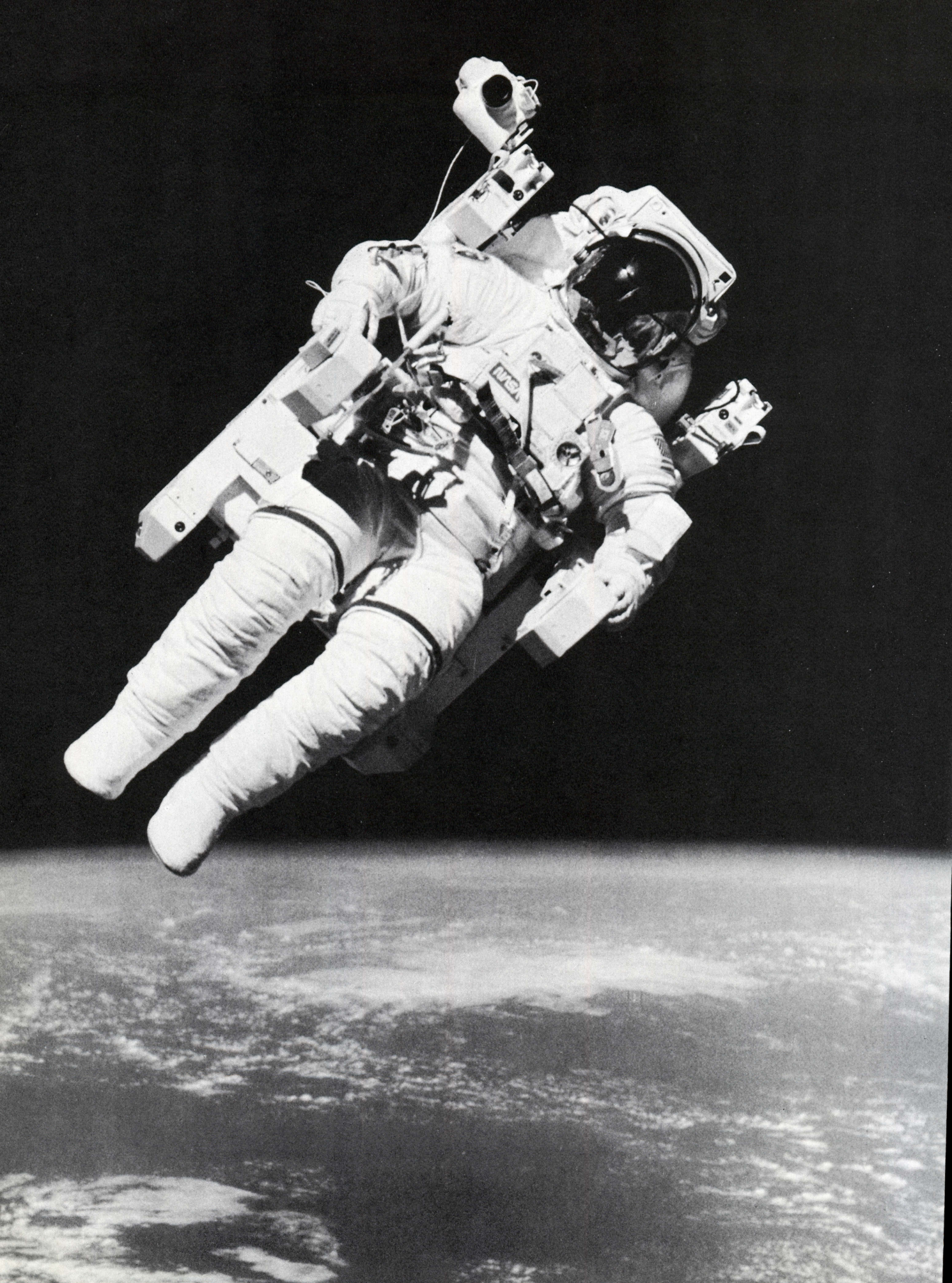


White Sands. Photo by Mark Nohl.

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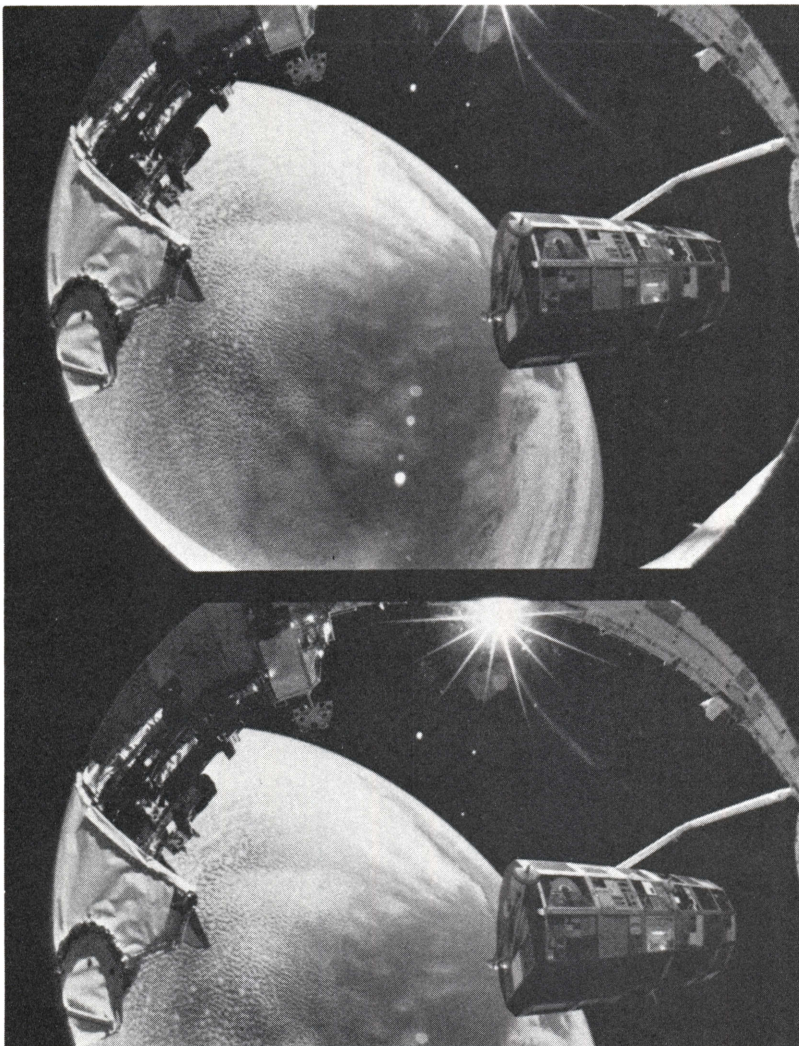
When NASA decided to take motion pictures in space they turned to the ARRI 35-3. Usually, before flying "off-the-shelf" products, NASA requires modifications. But when NASA engineers put the ARRI 35-3 to the tests—heat, vibration, g-forces—they found that expected modifications were simply not needed. The camera went into space as it came off the shelf and it performed flawlessly. ARRI engineering proved again.

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Space Cinematography: *Astronaut Moviemakers*

The Long Duration Exposure Facility (LDEF) is held above the payload bay in preparation for deployment. The sun is seen as a 14-point star.



During the filming of Stanley Kubrick's monumental *2001: A Space Odyssey*, various techniques were used to recreate a zero-gravity environment. Whole sets were turned upside down, floating pens were glued to 8-foot diameter panes of glass, and "weightless" actors were suspended over cameras, their bodies hiding any tell-tale wires.

But one small detail was overlooked by Kubrick's arsenal of effects technicians. When Dr. Heywood Floyd sips his lunch on the way to Clavius, instead of staying in the straw, as it would in real zero-gravity, the food slips back into the container. To achieve the proper zero-g effect, Kubrick would

have had to use an extra-thick milkshake formula . . . or shoot the sequence in space.

Happily, this latter option may soon become a reality for filmmakers. Already, two organizations have recently wrapped productions of films shot almost entirely in outer space – photographed by astronaut-cinematographers aboard NASA's space shuttles. Both marked the first time an American space flight has carried standard Hollywood motion picture cameras into space. But more importantly, they afforded man his first opportunity to record images in space, without relying on the impersonal instrumentation cameras sent up by NASA to record specific

work procedures.

Last September the American Society of Cinematographers inducted astronauts Dr. Ronald McNair and Captain Bruce McCandless as honorary members of the ASC, in recognition of their work as the first space cameramen on the Challenger mission 41-B.

This first project was mounted by Cinema-360, Inc., a non-profit corporation producing and distributing 180° hemispheric films for projection onto domes of specially-equipped planetariums throughout the United States. Titled *The Space Shuttle: An American Adventure*, the half-hour documentary places viewers in the center of the action from liftoff to landing, giving earth-bound audiences a compelling sensation of space travel. The film is designed so that viewers will come away with a heightened sense of the visual and human dramas of a typical mission, and a closer identification with the space program. The documentary was funded by a \$130,000 grant from the Gannett Foundation of Rochester, New York.

The Cinema-360 format uses 35mm Eastman color film, shot with Arriflex 35-3 cameras fitted with Nikkor 8mm f2.8 fisheye lenses for an ultra wide-angle field of view. The processed film is projected through a matching custom fisheye projection lens made in Tucson by Dick Buchroeder. When projected onto a hemispheric surface, such as a planetarium dome, the rounded screen displays an undistorted picture in accurate perspective and proportion. The special projection system was developed at Flandrau Planetarium by O. Richard Norton, Flandrau's acting director. This system is built and marketed by Radian Group, Inc., Tucson, Arizona.

"We're calling it *An American Adventure* because we want to capture something that goes beyond the excitement of space flight," says writer-director Richard S. Knapp, director of the Davis Planetarium in Jackson, Mississippi. "We also want to convey the enormous enthusiasm and commitment of the people behind the scenes. These include the technicians, the scientists,

Camera

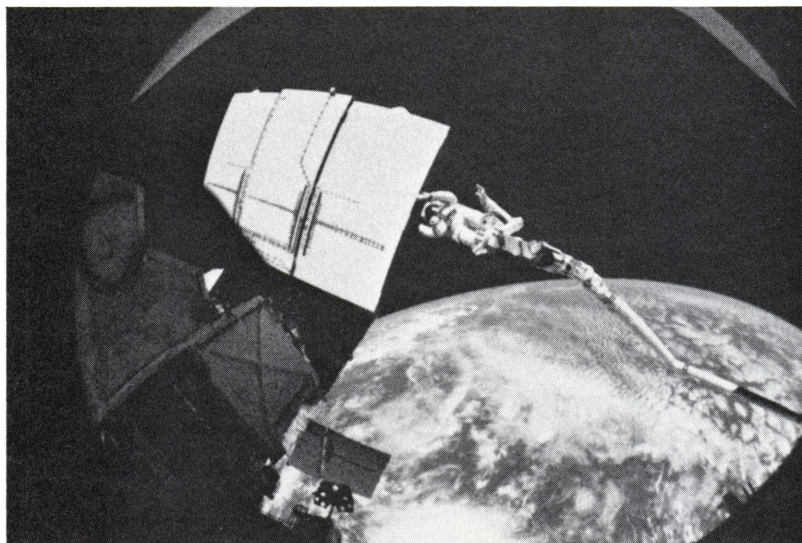
the assembly workers, as well as individual reactions among the crowds that gather on the beach to watch each launch first-hand." Thus, footage from two orbital missions was intercut with film taken of several launchings and landings, along with the comments and dramatic reactions of the people involved. More than 80,000 feet of film was shot during the production period, with as much as 4,000 feet filmed aboard the shuttle.

The second film was shot in the Canadian IMAX/OMNIMAX 15-perf 70mm format, a process using frames 10 times the size of standard 35mm negative. The 28-minute *The Dream is Alive* will premiere in June to IMAX theaters worldwide, again showing audiences the excitement of space flight in a substantially larger screen size. The film was commissioned by the Smithsonian Institution's National Air and Space Museum in Washington, D.C. Funding was provided by the Lockheed Corporation, a company long committed to the space program. The film's premiere is scheduled for June at the National Air and Space Museum.

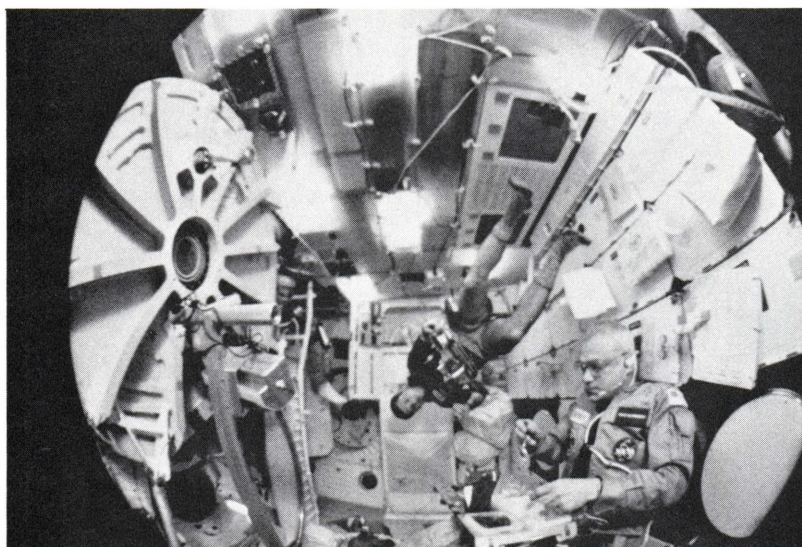
According to IMAX film distribution manager Rod Shannon, the film is not just a document of specific shuttle missions, but rather deals with several aspects of astronaut training, mission control, launch control, even activities at space camp with young children studying to be astronauts. "The theme of the film is space as a frontier that's a part of our environment now, and through the shuttle program we can go up, repair, and do activities in space," he explained. "It's not simply let's watch 41-C or 41-D launch. For example, on 41-C we documented the repair of a satellite. But even though that was the specific issue, we still managed to demonstrate certain capabilities of the space shuttle."

While both films offer striking views of space – some never before seen by the public – the stories behind their making are as fascinating as the giant images themselves.

"To shoot the footage we



High above the Solar Max Satellite, George Nelson photographs the solar panels after repairing the ailing satellite. Below, STS 41B Mission Specialists Bruce McCandless (foreground) and Bob Stewart enjoy a space-style meal.



needed for the Cinema-360 effect during the rigors of orbital flight," continued Knapp, "we selected two specially modified 35mm Arriflex 35-3 motion picture cameras." The cameras were modified only in their physical aspects to the extent they had to be triggered remotely, withstand extreme gravity forces and temperature changes, and accommodate the wide 8mm fish-eye lens. The pull-down mechanism, gearing, motor drive, electronics, magazine – all mechanical interior aspects were standard.

These essentially "off-the-shelf" cameras flew on board NASA Shuttle Flights 41-B and 41-C in February and April 1984. Arriflex agreed to write off nearly half the cost of the \$20,000 camera, and later loaned a second camera to the project as well. One of the 35-3 cameras was operated in the shuttle cabin by astronauts McCandless and McNair, who together photographed cabin activities, in-cabin testing and training exercises, and shuttle instrumentation.



Dr. Ron McNair (left) and Capt. Bruce McCandless make acceptance speeches after being made Honorary Members of the ASC.

According to Arriflex president Volker Bahnemann, this was a totally unmodified piece of equipment. "The handheld in-cabin camera was a bit of an afterthought," he recalled, "decided upon after NASA had seen test footage of the earlier camera. We neither had the time nor requirements to make any modifications to this one."

NASA agreed to install the other camera in a pressure-tight canister along the starboard side of the payload bay. This was housed within a special GAS can container (called the Get Away Special can) and remotely operated by Dr. McNair from inside the cabin. The payload bay camera filmed such activities as satellite deployment, the cargo bay Remote Manipulator System (Canada Arm) exercises, the first untethered spacewalk by McCandless using a man-manuevered rocket unit equipped with 24 compressed nitrogen thrusters, the capture and repair of the Solar Max satellite, and vistas of the earth which take in thousands of miles of ocean and land area in single frames.

Cinema-360 selected the new ARR13 on the basis of having used three Arriflex 35-2C's to film *The Launch of Columbia*. "We were looking for a camera that had pin registration to eliminate any jiggle that would be magnified greatly on the 60-foot planetarium domes," said Don Warren, chief cinematographer for the project. "And the camera offered a videotape hookup via the camera viewfinder and door, so that we could monitor the scene remotely. We also wanted one that was reliable and had a variable shutter to compensate for the extreme brightness found in space. Because of the fisheye lens size and the domed port, we couldn't use neutral density filters to reduce the light. And we needed a camera with a variable speed motor to increase our film shooting time

with the 1,000-foot magazine capacity, as well as speed-up the action since we found through watching other films that movement in space is very slow." As a result, footage in the payload bay camera was recorded at 12 fps for ground tracking shots, and 18 fps for scenes with moving figures.

Continued Warren: "From the outset, we understood that any camera used would have to be modified somewhat before encountering the extreme conditions of space travel. We had to have our equipment and film withstand temperature fluctuations ranging from minus 250° to plus 200° Fahrenheit, as well as the gravity forces and acoustical vibrations that accompany liftoff. For example, g-forces at launch would reach approximately 3.7 due to acceleration, with up to 10 g's of acoustical vibration.

"In addition, operating in a vacuum created a potential problem with the film. Film has a tendency to desiccate, freeze, lose moisture and become brittle if left too long under these conditions. So, packaging the camera in a pressurized and insulated container was essential."

To counteract the extreme vibrations, the camera was suspended in an isolating foam and spring-loaded mechanisms within the camera and lens became necessary. Activating switches for camera power, speed and exposure compensations were interfaced to the shuttle flight deck controls to enable astronaut McNair to operate the system remotely by way of a 12-function keypad. The camera was wrapped in a multi-layer insulation blanket and thermostatically controlled strip heaters were mounted on the body, magazine and lens to maintain them at a constant temperature of 70° F. $\pm$ 10.

The GAS can was decided as the most economical means of transporting and protecting the payload bay camera. The thermally-insulated GAS can was developed by NASA to hold small, self-contained experiments in the payload bay with a minimum of wasted space. Manufactured by Thiokol Corporation of Utah, the company responsible for making the shuttle's solid rocket booster casings, the can has a diameter of 19¼ inches and is 28¼ inches deep (a total of five cubic feet of usable volume). An extra three inches at the bottom of the can are reserved for

NASA interface equipment, which facilitated set up of the remote camera controls.

The GAS can is a thick forged aluminum cylinder with ⅝-inch plate aluminum top and bottom, capable of maintaining pressure throughout the flight. NASA engineers pumped 17 lbs. per square inch of dry nitrogen gas into the canister. A dry gas is used because the dome of the window becomes very cold in a vacuum. If the humidity is too high, it condenses on the window. Hence, a dry gas purge prevents window fogging, at the same time inhibiting the film from losing moisture.

On NASA's recommendation, the camera was secured within the can to negate the effects of launch stress. "Normal mounting systems, such as are used in these cameras, won't hold up to the stress of launch," explained Monty Moncrief, a NASA technician specializing in camera systems. "If you don't tie all the elements together in the unit, you'll end up with a thousand pieces in the bottom of the can." Therefore, special bracing around the magazine and camera body held the Arriflex 35-3 securely to the can lid. Void spaces were filled-in with high density solamide foam, creating a benign, suspended environment for the camera.

The GAS can itself was modified by Lockheed Corporation to accommodate the camera's lens and 1000-foot magazine. But having the fisheye lens protrude out the top of the can meant that part of the 1000-foot film magazine would also bulge out. Therefore, a custom canister lid was machined to accommodate the protruding lens and magazine. The lens was covered with a quality-coated quartz dome which enabled it to view outside while retaining pressure in the can. The 8mm fisheye was fitted to the Arriflex PL mount by Victor Duncan, Inc. in Dallas. With the lens pointing about 20° from vertical out the top of the can, the camera body hung just below the lid.

The payload bay camera was powered via the shuttle's internal power supply with 28 VDC, while the in-cabin camera used two Duracell batteries. The payload bay Arriflex drew 2.5 amps at 12 volts while running, whereas the heaters drew power throughout the entire period the shuttle was in space. Duracell, Inc. agreed to furnish the

power sources needed for the orbital camera system at no cost.

The Arriflex 35-3 cameras themselves were put through many tests. "NASA technicians ran them through a heat container, then sampled the air to see if there was any off-gassing of volatile material," says Bhanemann. "They bolted one camera to a vibration table and left it vibrating for 72 hours, then took it off and ran some footage through it. They weren't so much concerned with the flight deck camera. But the one in the payload bay would experience much vibration during liftoff."

The Arriflex 35-3's are used extensively for rigorous location filming. They are mounted beneath helicopters, bolted atop motorcycles, bumped around in housings under water, and even placed near explosives. During filming of *The A Team*, for instance, the production has succeeded in destroying no less than eight of the \$20,000 cameras over the past two years.

As it turned out, the ARR-13 experienced zero difficulties amid the alien environs of space. In fact, the only major problem happened while adapting the one camera to the GAS can on earth. Camera systems engineer Fred Pearce of LBJ Space Center, Houston, the man who engineered the GAS canister and coordinated most of the early integration work with the ARRI3, explained what was involved in fitting the camera to the container.

"We had to automate the iris in order to change the f-stop on the lens from f2.8 to f22. Since we were using an 8mm fisheye, there was no need to change focus. The canister was maintained at an ordinary sea level environmental pressure with the dry nitrogen and responded to the remote commands from the cargo bay using McNair's keypad (a standard box for controlling gases within the GAS cans). The camera was required to stick up out of the hemispherical dome port with the window's center corresponding to the exit pupil of the lens. An electrically-operated door sat over the window. When McNair turned the unit on with the keypad, the door automatically opened. A power on/off switch also controlled the strip heaters, and a standby-to-run switch burped the film one second.

"During testing, at one point the can had more pressure than we thought, and the person monitoring it didn't relieve the pressure before he removed the dome. He loosened the bolts only on one side. This put an asymmetrical force on the dome and caused it to crack."

"The GAS can camera held up remarkably well under the high frequency g-forces induced by vibration during liftoff," added Volker Bhanemann. "The entire operation of the 35mm cameras was 100% flawless. We had basically overestimated the g-force situation. The gravity forces are literally higher in a military airplane today than they are in the space shuttle under normal operation."

The cabin camera was stowed in two standard drawers which allow for vibration and shock protection. During shooting it was mounted in various locations using a Bogen clamp. When not in use, the camera was attached to a velcro mounting inside the cabin.

"The most significant problem that was projected as a problem by everyone at NASA," according to Bhanemann, "turned out not to be the problem everyone thought it would be – dealing with the tremendous lighting ratio and contrast differential between the blackness of space and the whiteness of the sun. To tell you the truth, the entire mission was sort of an anti-climactic experience due to the lack of extraordinary problems encountered."

To get the spectacular footage of shuttle missions, Cinema-360 ran training sessions for 15 astronauts on the operation of the Arriflex 35-3 camera. "We had several months to get our equipment together for training," recalled Don Warren. "The astronauts flew to Jackson in July of '83 and we discussed the projection systems and how to use the camera. (The Arriflex 2-C was reviewed since the Arriflex 35-3 had not been developed.) The astronauts were familiar with 16mm data recording cameras that were standard to all shuttles, but they had never operated 35mm equipment before."

Warren also worked with the crew trainers – Fernando Ramos, Steve Seus, and Jeff Bremer – to familiarize the astronauts with other equipment

necessary for filming (light meters, filters, etc.). It was like learning the basics at film school with only 11 months to prepare.

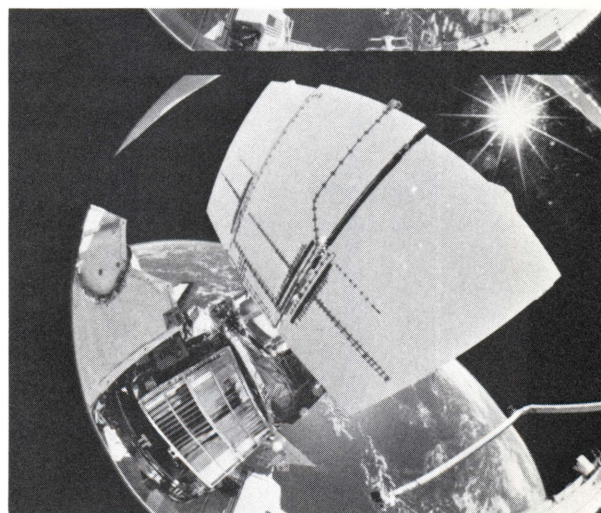
After the initial training of how to load and unload magazines, thread the camera, and use the battery pack, the astronauts were permitted to take the camera home with them for experimental shooting. As each knew they would encounter the harshest lighting conditions imaginable under the direct, raw, unfiltered sunlight of space, the astronauts shot footage in every conceivable situation. McNair was so gung-ho with the project, he even shot footage in one of the zero-g test planes to see how the camera would react. In all, more than 120 man-hours of training time were logged by the 15 astronauts.

Warren and crew trainers would then evaluate the processed footage and discuss how the hemispheric screen differed from flat theatrical screens on the basis of shot composition. Since the payload bay camera was already being installed in the GAS canister, the astronauts had no opportunity to work with it.

"These guys are so sharp, it's incredible. With things they had never even seen before, once they got a good look at it they knew how it worked. I think I sometimes offended them by telling them things over and over again," he admitted.

Richard Knapp summed up the importance of the training sessions: "The role of the astronauts was critical in this project. During the actual mission, the crew had to make many camera-related decisions of an aesthetic or

The Solar Max Satellite is rotated in the flight support structure in preparation for making repair to the main electric box.



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technical nature, depending on the conditions that existed in the mission at the time when the desired shot opportunities presented themselves."

The in-cabin camera was used to film "business as usual" aboard the February shuttle mission. Cinema-360 made it clear they wanted no "Hi Mom's" among the shot activities typical of flying the orbiter. These included scenes - some humorous - of crew members eating, exercising, getting in and out of space suits, handling payloads and conducting experiments under conditions of weightlessness.

"Looking at the footage we could tell the difference in the lighting. Closer to where we used the kicker or bounce light it was in the red. Other areas in the picture not affected by this showed a greenish tint as is normally the case with fluorescence. And when dealing with film shot in a remote environment like space, you often have to take what you can get. We realized there was not much we could do to correct the light in the orbiter. NASA does as well as they can in providing light, taking into account all of the safety specs and power consumption ratings. So very little light is provided, on the average between 10 to 18 footcandles."

Warren made it clear that no color corrective or special effects filters were used during filming. Some standard color corrections were made in the photo lab to compensate for the discrepancy between the light reading of the film and the actual light experienced in space and in the shuttle cabin.

On board the shuttle, McNair and McCandless followed identical lighting procedures as one would use during the lighting of a film set. They determined uniform readings for the entire cabin, that compared these with separate spot readings off the crew members' faces. The readings varied depending on where the key light, in this case, the sun, was facing relative to the shuttle's windows. As a careful rule of thumb, they slightly overexposed to obtain a denser negative. Most of the footage taken with the f2.8 fisheye was recorded with the lens wide open. "As it turned out, the photography of the cabin was of outstanding quality, with nice dense negatives achieved in just

about every situation," added Warren.

Cabin readings were made with a Sekonic Digi-Pro X1 light meter which NASA had tested and approved because of its digital capabilities. In the past, NASA has employed a Minolta spot meter. But both Warren and Knapp felt that the wider field-of-view of the Digi-Pro was better suited to the fisheye lens.

Eastman 5294 negative stock was chosen as the in-cabin film due to the low light levels. "We originally tested 5293, but when Kodak unveiled the new stock, we used it as our in-cabin film and were very pleased with the results," says Warren. The handheld camera utilized 400-foot film magazines which were changed four times during the mission, giving approximately 20 minutes of total running time.

Cinema-360 also sent up a 25mm f1.3 Superspeed Zeiss prime lens loaned by Arriflex, to test with the Arriflex 35-3. The astronauts used it for some data recording that NASA wanted, and the lens' sharpness brought back some splendid colors. When not in use, the camera was simply velcroed into a corner and forgotten. A few times McNair found it floating about the cabin like the all-seeing Martian eye from *War of the Worlds*. Needless to say, the zero-g environment made possible some very smooth panning shots.

The payload bay camera was loaded and installed several days before the flight. It was used on both the February and April missions, while the in-cabin camera was limited to February. During the EVA's, it photographed the check-out flight of the new Manned Maneuvering Unit (MMU) for the first untethered space walk in which an astronaut floated like a lonely human satellite 165 miles above the earth; the testing of the Manipulator Foot Restraints (MFR's) which crewmen used to hold themselves in place; and it obtained the only pictures of the successful recovery of the ailing Solar Maximum Satellite (or Solar Max as it's commonly called).

The camera was placed strategically in order to record as much of this cargo activity as possible. According to Warren, the astronauts were asked to shoot all footage with a high

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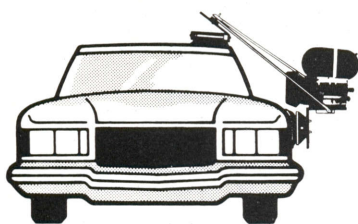
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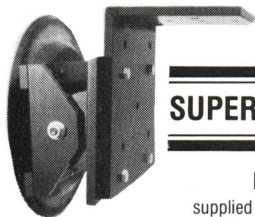
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sun angle. Before the launch, Warren had meetings with the Earth Observation Department at NASA to obtain tracking charts used for calculating the sun angle at any given point in space. Rather than rely on light meter, he had the astronauts use these sun angle charts to estimate the greatest angle of the sun to the lens axis. There was a 40° angle that the sun could not fall within to achieve satisfactory results.

Once the shuttle reached orbit, the astronauts adjusted the attitude of the craft to gain an unobstructed view for the camera. When the payload bay doors were opened, the camera lens was essentially "outside" with visual access to the unencumbered vistas of the flight.

"The camera was 20° from vertical out of the payload bay," explains Warren. "When the orbiter flew with the bay facing the earth, our camera then pointed to the earth as well. The camera then was pointed nearly straight up, tilted slightly toward the port side. As is probably evident, it's very difficult to visualize these things (especially in the zero-g environment of space) so we used diagrams, computer drawings and maps to figure on.

"The optimum sun angle was from the belly side or at least starboard side of the orbiter so that the light wasn't in the lens. On 41-B this worked out fine. On 41-C, since the action was more important than any spectacular views of the earth, the astronauts took it upon themselves to experiment and shot footage with the sun in the lens. They came up with some gorgeous footage of the Solar Max's capture of the satellite. In fact, it was the only footage obtained of the capture out of 26 cameras on board due to our remote capabilities."

The Earth was chosen as an exposure constant due to its predominance in the wide lens-taking area. Exposure was determined by a basic reference exposure obtained from the photo division of NASA: 1/250 of a second at f 11 with EI 64 film (5247). Warren said the two different film stocks used for the payload bay and flight deck cameras cut together well. A 15° angle was selected for the variable camera shutter with filming speeds of 12 and 18 fps. This brought the shutter speed to approximately 1/350 second.

This served as the basic reference exposure with high sun angles of 90° and the astronauts calculated from that.

"We didn't know how this film in the payload bay would react to raw sunlight," Warren added. "We found that the color temperature of the sun out in space (unhampered by atmosphere) is somewhere around 6500 or 6600° Kelvin, which creates problems in itself. We had screened a lot of film and found that in space you have intense white and dark areas. And often you encounter these two extremes simultaneously. One side of the shuttle may be in darkness, while the other is in blinding sunlight.

"We understood there was very little we could do to cut down the contrast from the sunlight. We were scared to even have the lens pointing toward the sun while shooting. But as I mentioned earlier, this turned out to be some of the most impressive footage shot."

What might sound easy on paper was sometimes a bit of a nightmare for Dr. McNair, responsible for all payload bay filming activities as well as the standard duties all astronauts have on any flight. Two hours into the mission he activated the strip heaters on the camera. Once Mission Control verified the signal, McNair set about performing the functions on his extensive checklist.

McNair had his hands full – literally – as both hands were on hand controllers while his body essentially dangled in free space. NASA television controllers on earth were there (in spirit) to help him determine relative f-stops based on the time of day and attitude of the spacecraft. As a result, McNair was able to select the filming speed and iris opening before the shuttle was in the designated position.

"Despite all our careful planning," continued McNair, "once the mission began, certain problems caused us to rearrange the order in which things took place. Suddenly the day scenes were taking place at night and the night scenes during the day. When the sun was optimum, Bruce was out of range and vice versa. It got real tricky. And this was not part of our major activity! This major activity was the EVA – the spacewalk."

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rarely relied on his prearranged checklist. He had spent so many long hours on Earth anticipating in his mind what the lighting conditions and shot requirements might be that he got the keypad system down to a science.

Both McNair and McCandless were surprised that the shadow areas were not as intensely black as would be expected from the tremendous contrast in space. There are a few strategically placed artificial work lights in the payload bay, but these are not powerful enough to expose film rated for direct sunlight. However, footage brought back showed only modest contrast. Evidently the shadow areas of the orbiter were illuminated somewhat by the reflectance of the earth.

"In a vacuum you get excellent transmissibility of light," says Capt. McCandless. "There's nothing whatsoever to blur the image or cause things to wash out or fade out. There was some accentuation of the curvature of the earth through the fisheye effect, however."

Life support-wise, McCandless could have remained outside for about seven hours. While filming, they needed to be especially sensitive to extreme and rapidly changing lighting conditions. In space, a complete sunrise to sunset "day" lasts only 50 minutes.

"We moved along at 4-miles-per-second with an orbital velocity of 17,000 miles per hour about 165 nautical miles above the earth," he continued. "This dynamic transition from day to night is a problem if you're trying to film. Days are 50 minutes and nights are 40 minutes long in orbit, so the sunrise and to sunset cycles back and forth pretty rapidly."

McNair added: "And that becomes a real problem if you're trying to do any type of filming during that dynamic transitional period. The type of film we were using wasn't suitable for night and the 25mm lens we shot with through the window wasn't suitable for either day or night, so we had to catch it during the transitional period."

"The unobstructed view of the payload bay camera is what's really so nice about this footage. By and large, colorwise, it is very similar to what we actually saw. In some ways, you could say that audiences are going to get a more striking panorama of

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space than crew members in the shuttle cabin." (McNair's final observation is based on the limited view of space that cabin-bound astronauts have through shuttlecraft windows.)

The Space Shuttle: An American Adventure was strictly shot as a documentary. Richard Knapp and crew weren't after a Hollywood-style look. The subject matter was important enough to present in a cinema verité manner.

Besides credits, there is only one other optical in the film. For a scene where the astronauts are watching the Palapa satellite deployment through the window, footage later taken of the satellite was optically combined to coincide with their reactions. Apparently, at one time Don Warren considered using shots of miniatures since Cinema-360 was originally scheduled for one flight. But through the second mission they were able to acquire more than adequate footage.

Cinema-360 was originally slated to fly on three missions, but NASA was unable to accommodate them on 41-D. Due to a decision to combine missions 41-D and 41-F, NASA could not fly both IMAX and Cinema-360 because of weight considerations. Cinema-360 went to IMAX, which was scheduled to fly in-cabin, and the latter company agreed to shoot an extra roll of specially-selected earth targets, then optically print them down to 35mm. As it turned out, the shots were never used by Cinema-360. Ice buildup on the port side of the shuttle forced the crew to fly side-to-sun for two days, which permitted no opportunities for earth shooting. The astronauts finally had a chance to film a number of targets Cinema-360 wanted, but the variety apparently wasn't diverse enough.

It's anybody's guess how the large negative size of IMAX would have cut together with the grainier 35mm original fisheye footage. Observed Warren: "I don't think the two formats are very compatible. With the tremendous size we are blowing images up on the planetarium domes you do see grain. But as long as it's consistent, it's not really noticeable. We did try blowing-up a few scenes filmed with NASA's 16mm cameras of satellites moving away from the orbiter, and saw a noticeable increase in grain with them."

Warren reflected further on this use of miniatures: "When the ASC membership watched our orbital footage at the September meeting, I heard someone remark during a particularly beautiful sequence that you couldn't get that type of effect in any lab or studio."

"The reason we devised this Cinema-360 system was because planetariums have traditionally been just star chambers where visitors came to sky gaze. We wanted to add something extra. Since the space shuttle is a popular subject with planetariums, we thought the idea of movement and the intensity you experience from a motion picture film would make it valuable to the planetarium community, and there are a few hundred in the U.S. alone. The film is more than just an educational tool; it's a fun film showing audiences what it's like to be in space. And the folks at NASA treated us like we were a major payload to their operations, supporting our project from the beginning. People there told me that Cinema-360 was the most exciting thing they'd worked on in several years."

Warren further predicted that the success of this project could very well open the door to feature type productions in space. "From all I've seen in the space program, that will be a reality sooner than most people think," he concluded.

Also flying with NASA was the Canadian IMAX system. This wide-film process was developed in the early '70s and so far uses the largest film frame in motion picture history - three times larger than standard 70mm frame and 10 times bigger than 35mm. The extra wide 15-perf frame increases the information-carrying capacity of film stock, enabling greater detail and resolution to be recorded by the lens.

OMNIMAX is an identical film format which vignettes (obscures) the corners of the frame. A 130° fish-eye lens records the images for later projection on dome screens over 57 feet in diameter. The fisheye effect is countered by the 130-degree dome of the theater. The unusual theater design limits seating capacity and requires that film be lifted 20 feet out of the projection booth to the film gate overhead. Even though less than the entire frame of film is used, the dome effect envelops the viewer's field of vision, creating

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Threshold Corporation, a subsidiary of IMAX Systems Corporation, trained astronauts in the use of the camera system, provided flight support, and is producing the film. IMAX president Graeme Ferguson is the producer/director of *The Dream is Alive*. His other IMAX credits include *North of Superior*, *Man Belongs to the Earth*, *Snow Job*, *Ocean*, and the profile of the first space shuttle flight in 1981, *Hail Columbia!* The new film is narrated by Walter Cronkite with special sound effects by B. P. Burt, Jr. of Lucasfilm. Both the IMAX and OMNIMAX versions are slightly different from one another, using different negatives to accommodate each format.

Ferguson initially went to NASA in 1983. In order to meet the specifications required to film aboard the space shuttle, certain modifications were made to an existing IMAX/OMNIMAX camera. As it was much too large to fit in the standard GAS can, the camera was limited to in-cabin filming. Also, its 1000-foot capacity magazines permitted only 3 minutes of film to be shot at one time.

"We didn't feel we could carry both interior and exterior projects forward simultaneously," reflected Rod Shannon, "since both would be very time consuming. There were too many risks to film outside as a special chamber would need to be built. There are certainly many rewards in shooting outside because you obtain different perspectives. Being inside the cabin limits you to shooting through windows and windows are used for many other functions by the crew. We're hoping that for future flights we might actually fly the camera outside in space."

"We developed a 1000-foot displacement magazine because that allowed us to put two mags into a standard locker of the shuttle," explained Ferguson. "The double chamber magazine wouldn't fit at all. We built a set of brackets so the camera could be attached with velcro to the window frames for taking shots outside the spacecraft. We also supplied handhold arrangements. Normally, on the ground, no one handholds an IMAX camera, but in zero-g, of course, they can." The crew tried some free floating shots moving the camera from the lower to upper

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decks. In zero-g, inertia becomes more of a problem with the larger-sized camera compared to the smaller Arriflex 35-3 used by Cinema-360.

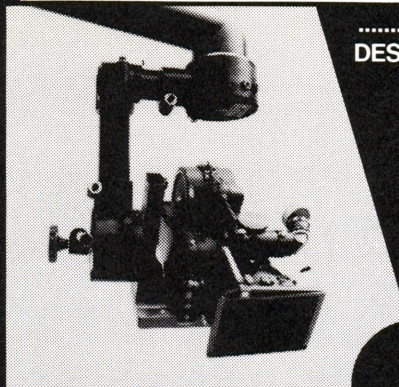
While on the subject of zero gravity, certain mechanisms for opening and loading the camera had to be altered slightly to make it easier to handle during weightlessness. Edges on the rollers were trimmed so that the film would slide in more easily. Rounded bumpers were added to the corners to make it safer. Special gimballed mounts were designed for each focal length lens to facilitate panning and tilting when shooting through the shuttle windows.

In all, there were between 50 and 100 smaller modifications to the camera itself. The person who supervised these changes was John Shaw. "Generally, there was a whole program devoted to making it more user-friendly," added Ferguson. "The astronauts actually reported it was easier to load the camera in zero-g than on the ground, particularly the magazines inside the changing bag."

IMAX flew on three shuttle missions. On flight 41-C (April 1984) it documented the capture, repair and re-deployment of the Solar Maximum Satellite which monitors changes on the sun. It also photographed the deployment of the Long Duration Exposure Facility (LDEF). Flight 41-D was delayed from its June 25th launch due to a faulty backup computer, and was scrubbed four seconds to liftoff the next day because of engine problems; 41-D finally went up August 30th and IMAX was there to record the unfurling of the 100-foot-high solar panel array (OAST-1) developed by Lockheed. They also filmed the successful deployment of three commercial communications satellites. In-cabin footage during the flight featured astronaut Judith Resnick, the second American woman in space. In October 41-G featured the first spacewalk by an American woman, Kathy Sullivan. The flight's high inclination orbit allowed for some extensive and unique earth views.

Camera training for all three flights began on December 1, 1983. For the 14 crew members involved, individual training ran from 5 to 10 months depending on which mission they were scheduled - about 25 hours each. The personnel instructed tended to revolve

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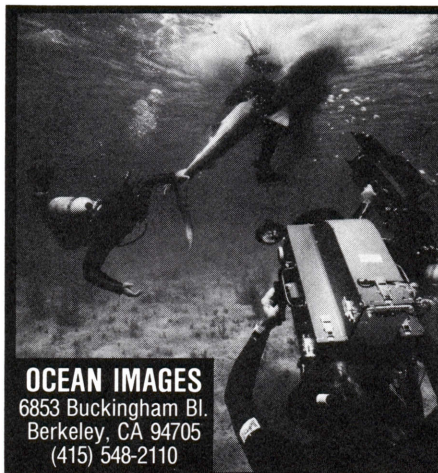


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around the commander or pilot of each mission, as their duties allowed more freedom in between liftoff and landing. The mission specialists working in the payload bay obviously couldn't be inside running the camera. Rod Shannon described the selection procedure: "We had to look within each crew and select someone who was a). personally interested in the program; b). would spend the time and effort before launch learning the equipment; c). would have the time during the actual mission."

During liftoff, the camera was stored in a double padded locker specially constructed by NASA for holding large payloads. The amount of film exposed on each flight varied from 7 to 10 rolls depending on the space and weight available. Ferguson said the crew produced two to three times more usable footage than expected.

Four Zeiss lenses were used: a 30mm f3.5 (the standard OMNIMAX lens), a 40mm f4 (the most frequently used IMAX lens), a 100mm f3.5, and a 250mm f5.6. According to Ferguson, these are about the fastest lenses you can get for the wide IMAX format.

"In the cramped quarters of the flight deck, there's essentially only one lens of much value and that's the 30mm. That establishes your limit and the way we determined exposure for these lenses was through experiments on the mid-deck mockups at JSC," he acknowledged.

Once the tests were evaluated, exposure was determined very easily - everything inside the cabin was shot wide open and the film was pushed two stops. When the crew worked in the vicinity of the windows or photographed through them, exposure readings became necessary. Added Ferguson: "Pushing two stops introduced grain but it was the only way we could do it." Considering the enormous size of the IMAX negative, grain would seem to be the last thing they had to worry about.

In addition, IMAX provided two artificial movie lights and recorded actual shuttle sounds in stereo. The stock emulsion was identical to that used by Cinema-360: 94 indoors and 47 for exterior scenes. "In essence, we had a small film production team up there," observed Shannon. "With space photography, you've got to plan every

detail because you're moving so quickly around the earth. If you don't, you see a land mass through the window, and by the time you set up to shoot it, it's gone."

NASA was delighted with the footage brought back by the shuttle missions. The image clarity of IMAX and 35mm enabled them to see things unobserved previously with their 16mm DAC (Data Acquisition Camera) equipment, designed during the Apollo program to be mobile and compact for moon exploration. "NASA was impressed with the reliability and performance of our cameras," stated Knapp. "We also introduced the use of high speed color negative film in space."

The success of Cinema-360's joint experimentation with them has certainly played a role in NASA's decision to revamp its filming equipment on board future shuttle missions. They will now add Arriflex cameras fitted with Zeiss lenses to their standard camera complement, which already consists of Nikon 35mm and Hasselblad 70mm equipment.

Volker Bahnemann of Arriflex explained the impact on future filmmaking in space resulting from NASA's decision. "This is a very significant factor and may be the key as far as we (as filmmakers) are concerned in the cinematographic universe," he said "In the past, NASA had almost drifted away from motion picture film, except for the 16mm Data Recording Cameras of their own design. Most of NASA's information and promotional images, other than stillframes, were derived from transmitted video images. So, what happened over a good number of years, I would imagine, was a certain dulling of the visual senses."

Now enter Robert Burrell of Victor Duncan, Inc. in Dallas, who in effect, told them: "Hey! You guys don't have to re-invent the wheel! We have perfectly good movie cameras available right now! There's no sense spending millions developing new ones."

According to Bahnemann, the rest is history. NASA took Burrell's advice and invited all camera manufacturers to submit bid proposals. NASA tested the SRs, and Aaton, a CP Gizmo, and a few other cameras. After a week of careful examination, Arriflex was awarded the contract.

"When these same people saw 35mm Kodak negative, printed onto up-to-date stock and presented on a large screen, they literally reorganized their approach to recording images in space. NASA has since instituted a policy whereby every subsequent shuttle mission will fly an Arri 16-SR II with automatic diaphragm control and Zeiss T2.0 10-100 macro-zoom lens as standard equipment. Thousands of feet have already been brought back that is absolutely marvelous stuff," Bahnmann maintains.

Cinema-360's impact is even more profound. Each shuttle crew now contains one primary and one secondary photo mission specialist. This means one astronaut and one backup are being trained to use motion picture cameras. The philosophical aspects this now brings to each mission concerning the way they see their environment is significant. The astronauts have become actual creative cinematographers. Before it was only a remote camera directed via servo control by a ground observer stationed in Houston.

"A typical response we've heard after a mission is: 'Next time I'll try to get this angle with less fill, etc.' So there's a creative visual aspect entering the picture now," Bahnmann says.

There have been only slight modifications made to the outside of each SR-II. Former red running-lights on the backs of the cameras have all been changed to green, for obvious reasons. A leather-like finish in the upper parts of the magazines, and the top carrying handle have likewise been removed. But the bulk of the camera has remained completely unmodified. "What we call 'off-the-shelf!'" says Bahnmann.

He also says that pumping nitrogen into the GAS can environment to keep the film from drying out may not be so important a consideration. This year NASA is planning to take a 16mm SR II camera actually out into space. But thermal control becomes a severe problem and the camera must be placed within a super-insulated shroud.

When NASA finally succeeds in establishing its orbiting space observatory, and begins flying civilians later this decade, filmmakers may be able to have certain elements of their scenario

actually filmed in space by qualified technicians hired from NASA. It's really not so different from all the stock footage producers have borrowed from NASA in the past.

To facilitate this end, last August the Society of Motion Picture Television Engineers formed a special Film Technology Committee of 26 experts to devise certain guidelines for shooting in space. The guidelines cover power requirements, mounting procedures and equipment storage, to name a few. This way, producers will know what to expect before approaching NASA with their ideas. Interested parties can obtain copies of the guidelines by writing SMPTE Headquarters at 862 Scarsdale Avenue, Scarsdale, New York, 10583.

As for the giant IMAX camera, what is its future in space?

One adjustment to be made is in the 1000-foot magazines. Ferguson reported they will fly 2000-foot loads so the short recording time will not be a critical factor. "Given all the other things the crew had to do, the amount of film we flew was really all they had time for. For outside shots you've got to get the camera right up against the window," he said.

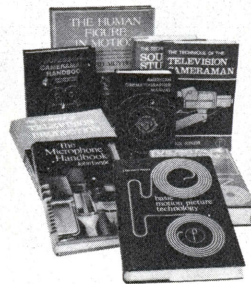
A program is underway to carry the IMAX camera inside an environmental canister mounted in the shuttle cargo bay for the future flights.

Rod Shannon speculates there is some interest among engineers at NASA to utilize the IMAX format in future missions for technical documentation purposes. "The contrast is astounding when you watch our film which incorporates a lot of NASA video and 16mm stuff, then see a similar scene shot with IMAX. The definition is unbelievable. These grainy, murky, grayish images suddenly transform into the black blacks of space and the bright whites of the astronaut's spacesuits. The detail is such you can literally read numbers on objects," he insists.

The formats may indeed be different, but the goal was the same. Both IMAX and Cinema-360 tried to penetrate beyond the basic ingredients of story, narration and music, and provide audiences with a space experience, presented in two unique ways. The strength of each film rests on how skillfully and realistically this environment is displayed on screen. ■

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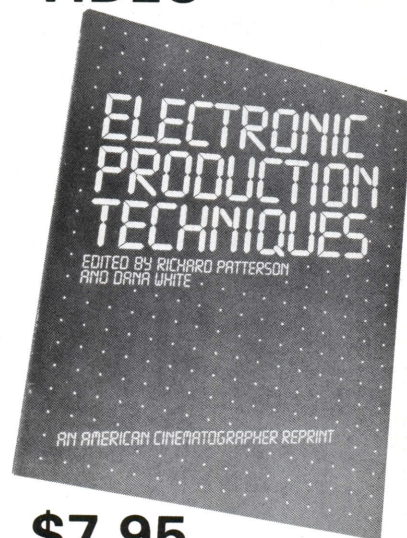
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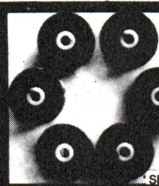
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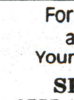
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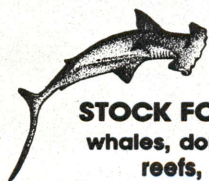
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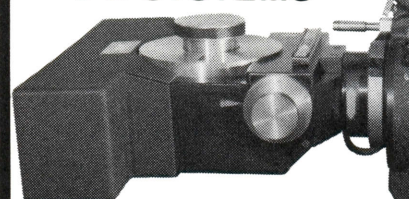
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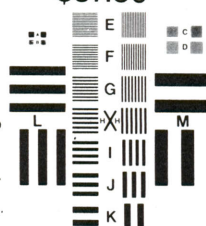
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From the Clubhouse



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The American Society of Cinematographers is not a labor union or a guild, but is an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as Directors of Photography and have demonstrated outstanding ability. Not all cinematographers can place the initials ASC after their names. ASC membership has become one of the highest honors that can be bestowed upon a professional cinematographer, a mark of prestige and distinction.

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"An Evening with Eastman Kodak," first in a series of monthly programs dealing with state-of-the-art photographic and video developments, was presented at the Clubhouse of the American Society of Cinematographers in March. Three officers of the company were here from Eastman in Rochester, N.Y., to conduct demonstrations.

Leonard F. Coleman, newly appointed general manager of marketing for Eastman's motion picture and audio visual division, delivered a multi-image presentation concerning Kodak's view of the future. Robert Rorke demonstrated the 8mm video camera which Eastman is introducing, and Don Adams made a presentation featuring the new instant slide film which is now a reality.

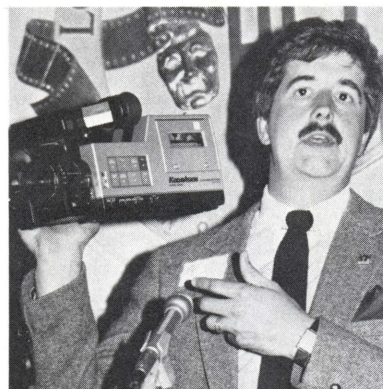
John McDonough, regional sales manager for motion picture and AV markets, co-hosted the program with ASC President Stanley Cortez. McDonough also discussed the new building program now being instituted at Eastman's Hollywood facilities. Coleman and McDonough are ASC associate members.

Sherwood "Woody" Omens became the newest member of the A.S.C. in March. A director of photography with more than 20 years in the motion picture industry, he has been associated with a long list of distinguished television shows and features.

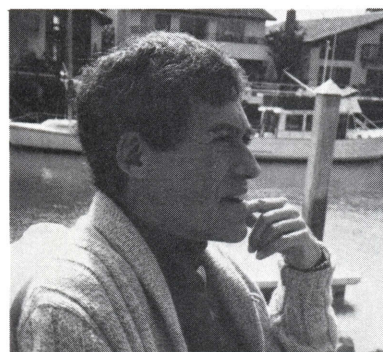
Omens was an associate professor at the USC Cinema school from 1967 through 1977 and he is a graduate of the Art Institute of Chicago as well as the University of Chicago. He holds a masters degree from the University of Southern California. His avocation is painting, specializing in airbrush and egg tempera.



Leonard F. Coleman



Robert Rorke with new Kodak video camera

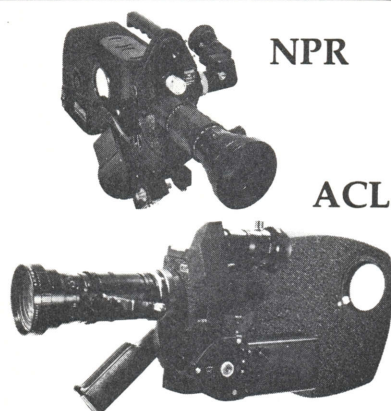


Sherwood Omens, ASC

In 1981 Omens was nominated for an Emmy for a segment of the *Magnum PI* show and in 1971 was nominated for an Academy Award for cinematography of a documentary called *Somebody Waiting*. He has also shot more than 1,000 commercials, many of which were award winning efforts.

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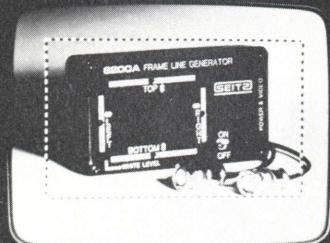
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In Memoriam

Fred Mandl, ASC, a cinematographer whose work took him to many parts of the world, died February 21. He is survived by his wife, Lee, son, Peter, daughter, Nicolette, and brother, Hans.

Born in Cologne in 1908, the son of a prominent film producer, he started work in the film lab at the UFA studio in Berlin at the age of 16. After two years he became assistant to Karl Freund, ASC, who made some of the most celebrated German silent films during that period. Later, as first cameraman, he filmed two features for Sascha Film in Vienna. In 1930 he went to Paramount in Paris, where he was assistant to Harry Stradling (Sr.), ASC. He also became well known as an aerial, second unit and process cameraman, and photographed two features in England.

In 1934 he shot 20 documentary shorts in Europe for Paramount and the Tobis feature, *Mauvaise Graine*, directed by Billy Wilder. He then moved to Spain as chief cinematographer for that country's largest studio, where he photographed six features including *Verdena de la Paloma* (1935), the most honored Spanish production of the 1930s. His work as a combat cameraman during the Spanish Civil War led to a political situation which made it necessary for him to leave in a hurry. He came to the United States in 1937.

Unable to find work in Depression-stricken Hollywood, Mandl joined Azteca Films in Mexico City, to make several features including *Odio* (1939), which won international acclaim and was released in the U.S. as *Harvest of Hate* by RKO-Radio. Returning to Hollywood in 1941, he photographed Pete Smith shorts at MGM. He became a member of the ASC after joining the Army. He was in the thick of the European campaign, both as a combatant and as a cameraman at the Normandie Beachhead and with Patton's Third Army in France and Germany.



Wounded, he was sent to a hospital in England during the Blitzkrieg. He returned to civilian life in 1945 and photographed features and shorts for Columbia. He also worked as an operator for other cameramen, including Stradling, James Wong Howe, ASC, and Frank Planer, ASC, on *Streetcar Named Desire*, *Helen of Troy*, *The Caine Mutiny* and others.

Mandl was director of photography of many TV series, including *Twilight Zone*, *The Fugitive*, *Daktari* (for three years), *The FBI Story*; *O'Hara, Treasury Agent*; *The Loretta Young Show*, *Leave It to Beaver*, *A Man Called Shenandoah*, *Medical Center*, *The Munsters*, and *Checkmate*. TV features and pilots included *Tom Sawyer* (filmed in Canada), *Rendez Safe*, *To Rome With Love*, *Goin' My Way*, and *Keeper of the Wild*. He was nominated for an Emmy for the Movie of the Week, *Trapped*.

He went to the jungles of Venezuela making films for the Princeton Institute, to Africa with Fred Zinne- man for pre-production work on *The Nun's Story*, and suffered damage to his eyes and feet while photographing polar bears in the Arctic. He was the first to photograph from a platform mounted on the side of a helicopter (for *The Pride and Passion*, in Spain) and flew with the Blue Angels.

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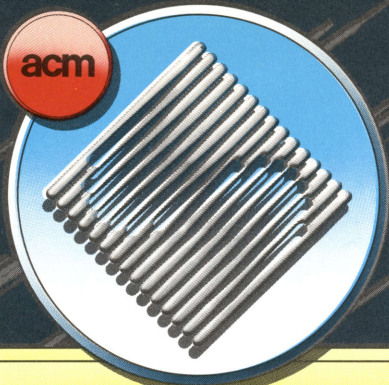
The picture which impressed me most was *Resurrection*, which was filmed at Tec-Art Studio and on location at Truckee, California, in the winter of 1926. Directed by Edwin Carewe from the Tolstoy novel, it was an early triumph for the beautiful Dolores del Rio and her leading man, Rod LaRocque. The photography, which was some of the earliest to be done with panchromatic film and to utilize incandescent lights, was by Robert Kurrle, one of the great camera artists of the time, with Al Green as second cameraman. I was lucky enough to get my first paying job as an assistant cameraman—\$25 per week, day and night—on *Resurrection*. Especially memorable was the trek to Siberia sequence, for which 1,000 extras were brought in daily by train from Sacramento to struggle across the snow-covered mountains.



Lester Shorr, ASC, retired recently after nearly 60 years in motion pictures. After working on numerous features and serials, he made the switch to television and won the first Emmy for cinematography for *Medic* in 1954. His TV work includes *Laverne and Shirley*, *Happy Days*, *The Odd Couple*, *Love American Style* and *Eight is Enough*. Feature films include *Take the Money and Run* for Woody Allen, *Hondo*, *Ride Beyond Vengeance*, *The Peacemakers*, and *The Running Target*. During World War II he was a combat cameraman in the China-Burma-India campaign.



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Guy Genin, internationally known for his expertise with Aaton cameras and time code systems, heads the Zellan Optics service staff.

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